



## Globalization and Agricultural Output in Nigeria: An Examination

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### ABSTRACT

Macroeconomic factors, including globalization indicators, are expected to influence agricultural productivity. Successive government in Nigeria, over the years have made efforts to improve the agricultural sector output with various policies and programmes. This study, therefore, investigated how selected globalization variables, namely, trade openness, exchange rates and interest rates, have impacted on agricultural sector output from 1992 to 2023 in Nigeria.

The study utilized descriptive statistics, correlation analysis, the ADF unit root test, the ARDL Bound test for assessing long-term relationships, and the ARDL long form and error correction mechanism techniques to determine the impact of trade openness, exchange rates, and lending rates on agricultural sector output over the study period.

Results of the ARDL revealed that in the short run, exchange rates negatively and significantly affect agricultural output (coefficient = 5.379515,  $p = 0.0002$ ) and the effect of trade openness on agricultural output was positive but statistically insignificant. Exchange rate also has a negative and significant effect on agricultural output (coefficient = 5.42216,  $p = 0.0423$ ). On the long run, exchange rate continues to have a negative and significant impact on agricultural output (coefficient = 15.14043,  $p = 0.0039$ ), while lending rates also have a sustained negative impact on agricultural output in the long run, (coefficient = 1.41112,  $p = 0.0061$ ) while trade openness has a positive but insignificant effect on agricultural output in the long run

The study recommends that Nigerian government should stabilize the exchange rate through effective monetary and fiscal policies; should invest in improving the competitiveness of the agricultural sector and implement policies that lower the cost of borrowing.

**Keywords:** Globalization, Trade Openness, Economic Development, ARDL

### 1. INTRODUCTION

The Nigerian agricultural sector, which could be sub-divided into crop farming, livestock farming, fisheries, apiculture and snail rearing, is the sector that provides food for the people, raw-materials for the agro-allied industries, employment for both the rural and urban dwellers and foreign exchange earnings.

The sector was adjudged to be the backbone of the Nigerian economy before oil discovery in the 70's for it contributed about 60% of the Gross Domestic Product (GDP) in the 60s and early 70s. Asaley et al (2021) opined that the sector was the mainstay of the Nigerian economy by directly contributing about 60% of the Gross Domestic Product (GDP) in the 1960s and accounted for 70% of the Nigeria total exports in addition to providing more than 70% of the informal employment in the rural areas, and that the sector was not only the driver of the Nigerian economy but also the means of livelihood for the majority of Nigerian people.

Since oil discovery, a shift of attention on the sector was obvious, and this was evident in the dwindling productivity or contribution of the sector to the Gross Domestic Product (GDP), and low and unstable credit to the sector as a proportion of total credit to the economy. From the available statistics in the Central Bank of Nigeria Statistical Bulletin from 1986 to 2022, the contribution was in most cases, less than 30% except in 2002 and 2003 that were 37.52% and 34.48% respectively. In the same vein, credit to the sector was not encouraging in the same period because, in 1986 to 1996, it was below 20% on yearly basis from 1997 to 2004 it was, on yearly basis, less than 10.00%, and in the year 2005 to 2022, the credit value in each of the years was not up to 7.00%.

To reverse the ugly trend of low productivity and make the sector great again, the Nigerian government initiated numerous agricultural related programmes and equally established financial institution needed to increase fund accessibility by the farmers. These included: Farm settlement scheme; National Accelerated Food Production and Programme (NAFPP); Operation Feed the Nation (OFN); Bank of Agriculture (BOA), and Agricultural Credit Guarantee Scheme Fund (ACGSF) among others. In addition, the government believed that opening up the economy could attract increased capital inflows, technology and expertise into the sector. This belief was clearly anchored on the government ardent belief in the ideology of globalization which has been accepted as an instrument of world integration and unification; achievement of borderless world and increased border transactions; facilitating global marketplace; and realization of improved and enhanced international trade and Financial flows, with the Cogent expected benefits which included, increased foreign direct and portfolio investment inflows; availability of technical expertise and technological innovation; realization of

economics of scale, and increased participation in foreign trade and markets. Polackowa, (2020), was of the view that globalization was the integration and unification of the world economics, and it involved the interdependence of nations around the world through increased border transactions and financial flows. Kwanashie, (2018), defined globalization as the process of integrating economic decision-making all across the world and creating a global marketplace in which, increasingly, all nations would be forced to participate, and that eventually, globalization would create a borderless world and facilitate increased international trade and capital flows among countries of the world.

However, with productivity still not as high as it used to be, this study investigates broadly the effect of globalization on the sector, and specifically that of trade openness foreign exchange and lending rates on the Nigerian agricultural sector from 1992 to 2023.

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## 2. LITERATURE REVIEW

Ewubare and Eytipe (2015) examined the effects of government spending on the agricultural sector in Nigeria. The ordinary least square of multiple regression, the Johansson co integration techniques and the error correction model were used for the analysis. The results showed that the coefficient of determination is 0.9468 and the coefficient of the Error Correction Model (ECM) appeared with negative sign and statistically significant. The lag two and three forms of the explanatory variable, government expenditure on Agriculture were positive and statistically significant. Based on the findings, the study recommended for an increased funding of the agricultural sector in Nigeria.

Monika (2015) was interested on globalization and its impact on rural agriculture in India. The study used literature review approach. From the studies reviewed, it was discovered that majority of the study confirmed that globalization promotes agricultural output. A similar study by Olagunju et al. (2015) examined the impact of foreign trade on the growth of agricultural output. The study used annual time series data from 1978 to 2008. The correlation analysis showed that there is existence of strong relationship between the variables. However, the results also revealed that petroleum export, food import and population growth rate were the significant factors that influence the growth of agricultural output in Nigeria.

Usenobong, (2015) in his study found that globalization has a positive impact on Agriculture, including other variables such as manufacturing and international trade using error correction framework. Uдах and Nwachukwu, (2015) on the determinants of agricultural growth in Nigeria revealed that agricultural labour, infrastructural development and total factor productivity had positive relationship with agricultural GDP(AGR): thus, they were the factors that contributed majorly to Agricultural GDP in Nigeria.

Yousef et al. (2015) examined the level of foreign direct investment on agricultural sector and the consequential effect on the contribution of the sector to the country's Gross Domestic Product (GDP). The result obtained showed that the inflow of FDI to agricultural sector does not follow a regular pattern and the sector's contribution to GDP is in direct relationship with the inflow of FDI. This is so to the extent that the impact of FDI on Agriculture would only be limited to the amount of the FDI that is channeled to the sector. The study of Nahanga and Becvarova (2016) that investigates the impact of agricultural exports on economic growth in Nigeria using Vector-Autoregressive model with all its dynamic components supported the hypothesis that agricultural exports led economic growth in Nigeria. The results, however, showed an inverse relationship between the agricultural degree of openness and economic growth in the country, in their Fixed-effect model, Edeme, et al. (2016) showed that agricultural exports have not impacted significantly on the economic growth of ECOWAS countries such as Cote d'Ivoire and Nigeria with respect to the Republic of Benin, which is the selected baseline.

Joseph *et al.*, (2016) studied the channels through which globalization affects financial sector

development in Nigeria. To this end this study examines the data for these variables used in this study for the period (1987-2014). The results obtained in this study have established that globalization has a significant effect on financial sector development in Nigeria. Higher pace of globalization is found to be associated with a good financial system in Nigeria and it also serves as a stimulant for the economy. The study calls for an enabling environment for the financial system as well as interest rate targeting to encourage more financial in-flow.

Alimi (2017) studied globalization and non-oil export performance in Nigeria using a hound Co-integration approach and time series data from 1970 to 2014. The paper employed the Auto Regressive Distributed Lag (ARDL) approach to analyze the relationship between globalization and non-oil export performance. The results revealed that there is a long-run relationship between globalization and non-oil export performance in Nigeria. The parameter estimates showed that globalization, official development assistance, investment and exchange rate had a positive impact on non-oil sector export in Nigeria. In addition, gross domestic product and foreign direct investment have negative impact on non-oil sector export performance in Nigeria. The study concludes that the impact of globalization on non-oil export performance is a long-run phenomenon. Thus, the government should adopt and implement trade policies that are capable of sustaining non-oil sector growth in Nigeria.

Egberi and Samuel (2017) was interested in globalization and economic growth in Nigeria using a co-integration approach from 1980 and 2015. The co-integration and error correction mechanism were adopted. The result showed that current FDI and one period lagged FDI, one period lagged exchange rate, current Balance of Payment and two period lagged openness of the economy to the outside world have a positive and significant impact on the level of economic growth in Nigeria. The ECM shows a satisfactory speed of adjustment. The Johansson co-integration test indicated a long run equilibrium relationship among the variables. The result recommends policy to expand FDI and an increase in the level of trade liberalization.

Ojo (2018) conducted a study on empirical information on agricultural productivity in Nigeria with focus on the impact of globalization from 1986 to 2015. The study adopted Error Correction Model to test for the short run relationship having employed Augmented Dickey Fuller and Phillips-Perron unit root tests to verify stationarity of the variables used. While bounds Autoregressive distributed lag testing approach was employed to account for the long run relationship of the explanatory variables on the dependent variables. The result of the data analysis indicated that foreign exchange, degree of

openness and foreign direct investment were not statistically significant in influencing the favorable trend of agricultural productivity in Nigeria, thus, its growth potential. However, consumer price index impacted positively on agricultural productivity to a larger extent. The study concluded that globalization has no significant impact on the growth of agriculture productivity in Nigeria. The study thus recommended that government should demonstrate proactive will in redirecting economic policies that would make the economy to be agricultural driven system through aggressive diversification of the economy in order to key into global world system. This must be reflected in increased investment and FDI into agricultural sector of the economy.

Akinwale and Obagunwa (2021) examined the effect of globalization on agricultural sector development in Nigeria. The study employed annual time series data from Central Bank of Nigeria Statistical Bulletin between 1986 and 2018 which were analyzed with Autoregressive Distributed Lag technique. The result of the Bound co-integration test indicated that there is a long run relationship among agricultural sector output, foreign direct investment, foreign portfolio investment as a percentage of gross domestic product, trade openness and exchange rate. The result of the ARDL revealed that trade openness, foreign portfolio investment and exchange rate stimulate agricultural sector output while foreign direct investment negatively influence agricultural sector output in Nigeria. It was concluded that globalization plays important role in the development and enhancement of agricultural sector output in Nigeria through openness and financial inflow to the sector. Thus, government should formulaic policy frameworks that will enhance the trade relationship between the agricultural sector and other developed nations to facilitate the inflow of important raw materials for the sector's productivity, government should formulate policies that will ease direct investment inflow into the agricultural sector by creating linkage between foreign multi-national companies and agricultural sector in Nigeria.

### 3. METHODOLOGY

#### 3.1 Theoretical Framework

This study adopted exogenous growth theory. According to the theory growth was fueled by technological progress independent of economic forces. Meanwhile, the neoclassical model stated that in the long term, the growth rate of output per worker was dependent on the rate of labour-augmenting improvement in technology, which was determined by factor(s) not contained in the model (also known as exogenous factors). The model implied that all economies that used similar technology, which could improve over time, should have converging productivity growth rates. In view of this, Verier (2017) revealed that lack of investment by both private and government in agricultural sector was the core factor responsible for decline in agricultural sector in developing countries. Alibi (2014) expressed similar claim and remarked that foreign agricultural aid and the public domestic expenditures on agriculture were the two components that could facilitate increase in agricultural productivity. The neoclassical production function, which expressed the concept of foreign aid to agricultural sector was given as follows:

$$Y = f(LKT) \dots\dots\dots(3.1)$$

where  $a+b=1$ . Y = agricultural output, L = labour, K = capital, T = time or the rate of technological progress.

Adding a and b that are assumed to be foreign aid to equation that represent the proportion of Y that accrues to labour (L) and capital (K), we have the following equation ii

$$Y = L^a K^b T \dots\dots\dots(3.2)$$

#### 3.2 Model Specification

This study adopted the model of Akinwale and Obagunwa (2021) given below in linear form with little modification.

$$ASO = f(TOP, FDI, FPIGDP, EXR) \dots\dots\dots (3.3)$$

Where;

ASO = Agricultural Sector Output

TOP = Trade Openness

FDI = Foreign Direct Investment

FPIGDP = Foreign Portfolio Investment (% of GDP)

EXR = Exchange Rate

The modified version of the model was given below in a linear model equation.

Model 1

$$AGRIO = f(TRA0, EXCH, LR) \dots\dots\dots (3.4)$$

Where:

AGRIO	=	Agricultural Output
TRAO	=	Trade Openness
EXCH	=	Exchange Rate
LR	=	Lending Rates

Where the econometric form of equation (ii) becomes

$$\ln \text{AGRIO} = \Omega_0 + \Omega_1 \text{TRAO} + \Omega_2 \text{EXCH} + \Omega_3 \text{LR} + \mu \dots\dots\dots (3.5)$$

where:

$\ln$  = natural logarithm

$\Omega_0$  = regression intercept

$\Omega_1 \dots\dots\dots \Omega_3$  = regression coefficients

$\mu$  = stochastic error term

### 3.3 Method of Data Analysis

In this study selected pre-estimation diagnoses were carried out on the research variables in order to identify their statistical properties and characteristics. The methods used for this purpose include the descriptive statistics, Pearson's correlations, Augmented Dickey Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) Bound test for co-integration. Based on the dictates of these tests, especially the unit root and co-integration tests, the ARDL long and short (Error Correction Mechanism, ECM) forms were used to determine the effects of the explanatory on the dependent variables.

## 4. RESULTS AND DISCUSSION

The variables in this study are analyzed using selected preliminary tests (for the characteristics of the variables) and the ARDL technique for inferential purpose (determination of effects).

### 4.1 Preliminary Diagnoses

#### Descriptive Statistics

The descriptive statistics are the statistical properties of each of the research variables. Table 1 contains the descriptive statistics of all the variables used in the study.

Table 1: Descriptive Statistics

	LOGAGRIO	TRAO	EXCH	LR
Mean	11031.18	3.967729	183.5134	24.73173
Skewness	-0.025004	0.142219	1.441493	0.513740
Kurtosis	1.505845	2.184863	4.855424	2.554106
Jarque-Bera	2.980001	0.993804	15.67227	1.672715
Probability	0.225373	0.608413	0.000395	0.433286
Observations	32	32	32	32

Source: Author's Computation (2024).

The means of LOGAGRIO, TRAO, EXCH and LR are 11031. 3.967729, 183.5134 and 24.73173 respectively. Whereas LOGAGRIO is negatively skewed to the left of the mean but close to it (-0.025004), TRAO, EXCH and LR are all skewed positively to the right of the mean (0.142219, 1.441493 and 0.513740 respectively). In addition, LOGAGRIO and TRAO are platykurtic with kurtoses < 3 (1.505845 and 2.184863 respectively), EXCH is leptokurtic with kurtosis greater than 3 (4.855424) while LR is mesokurtic (approximately 3). The Jarque-Bera statistics and their probabilities show that while LOGAGRIO, TRAO and LR are normally distributed with probabilities higher than the 5% level of significance, EXCH is not normally distributed with its probability less than 0.05.

### Correlations

The Pearson's correlation coefficients are used here to estimate the degree of co-movement (or otherwise) between the dependent and explanatory variables. Table 2 contains the correlation coefficients.

Table 2: Correlation Coefficients

	LOGAGRIO	TRAO	EXCH	LR
LOGAGRIO	1			
TRAO	0.133789563	1		
EXCH	0.829516535	-0.09287561	1	
LR	0.300307052	-0.53208623	0.359430464	1

Source: Author's Computation (2024).

TRAO, EXCH and LR have positive correlations with LOGAGRIO with as much as 0.133789563 (13% - low), 0.829516535 (83% - very high) and 0.300307052 (30% - fairly moderate) respectively.

### Test of Stationarity

This test shows the level at which the research variables become stationary. Table 3 summarizes the results of the ADF tests of stationarity.

Table 3: Stationarity Test Results

Variable	Stationarity Test at Level		Stationarity Test at First Diff		Stationarity Order
	ADF Stat	Prob.	ADF Stat	Prob.	
LOGAGRIO	-0.363823	0.9035	-4.235459	0.0024	I(1)
TRAO	-2.727772	0.0808	-5.726885	0.0000	I(1)
EXCH	1.898603	0.9996	-3.204183	0.0072	I(1)
LR	-3.119419	0.0354	-	-	I(0)

Source: Author Computation (2024).

In Table 3 reveals that while LOGAGRIO, TRAO and EXCH are stationary at first difference I(1), LR is stationary at level I(0). The mixture of I(0) and I(1) provides the basis for our use of the ARDL model to find the effect of globalization on agricultural output in Nigeria.

### Test of Co-integration

The study used the ARDL Bound test to determine whether a long run relationship exists between AGRIO and the explanatory variables (TRAO, EXCH and LR). The results of the Bound test are presented in table 4.

Table 4: Long run Relationship (Co-integration) Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.884022	10%	3.47	4.45
K	3	5%	4.01	5.07
		2.5%	4.52	5.62
		1%	5.17	6.36

Source: Author's Computation (2024)

The F-statistic of 6.884022 is greater than both the lower and upper bounds critical values at 5% level of significance (4.01 and 5.07 respectively), it implies that the dependent and explanatory variables are co-integrated (have long run relationship), hence we can proceed to estimate the effect between them.

#### 4.2 Effect of Globalization on Agricultural Output in Nigeria

In Table 5, we present the ARDL model estimates for the effect of TRAO, EXCH and LR on LOGAGRIO during the short run (SR) and long run (LR).

Table 5: ARDL Models' Results

Method = ARDL. Dependent Variable = LOGAGRIO							
Variable	Short-run (SR) Effect			Long-run (LR) Effect			
	Coeff.	Prob.	Decision	Variable	Coeff.	Prob.	Decision
TRAO	10.49676	0.6582	Insignificant	TRAO	29.54272	0.6592	Insignificant
EXCH	-5.379515	0.0002	Significant	EXCH	-15.14043	0.0039	Significant
LR	-5.42216	0.0423	Significant	LR	-1.41112	0.0561	Insignificant
C	-313.8640	0.1354		C	-313.8640	0.5883	
CointEq(-1)	-0.355308		0.0000				
R <sup>2</sup>	0.524384			R <sup>2</sup>	0.775284		
Adjusted R <sup>2</sup>	0.490411			Adjusted R <sup>2</sup>	0.694341		
DW Stat	1.697599			DW Stat	1.697599		
F-Stat	15.43550			F-Stat	1055.275		
Prob (F-Stat)	0.000030			Prob (F-Stat)	0.000000		

Source: Author's Computation (2024).

During the SR, TRAO has a positive but insignificant effect on LOGAGRIO such that a unit increase in TRAO will make LOGAGRIO to insignificantly increase by about 10.49676 with a probability ( $p$ ) of 0.6582 which is greater than the 0.05 level of significance (LOS). EXCH rate has a significantly negative effect on LOGAGRIO such that a unit increase in it will reduce LOGAGRIO significantly by as much as 5.379515 with  $p = 0.0002 < 0.05$  LOS. Also, LR has negative and significant effect on LOGAGRIO such that a percentage increase in the LR will lead to a significant reduction of as much as 5.42216 in LOGAGRIO with  $p = 0.0423 < 0.05$  LOS. During this period, about 0.490411 (or 50%) of the variations in LOGAGRIO is accounted for by the explanatory variables. In addition, the CointEq(-1) of -0.355308 connotes that not less than 35.535% of the past year's deviations from equilibrium are corrected in the present year. The D-W Statistic = 1.697599 (approx.. 2) shows that the problem of serial correlation did not affect the results while the F-Stat (15.43550) and its probability (0.000030 < 0.05 LOS) show that the research model is both valid and reliable.

On the LR, TRAO has a positive but insignificant effect on LOGAGRIO such that a unit increase in TRAO will make LOGAGRIO to insignificantly increase by about 29.54272 with  $p = 0.6522 > 0.05$  LOS while EXCH rate has a significantly negative effect on LOGAGRIO such that a unit increase in EXCH will reduce LOGAGRIO significantly by 15.14043, with  $p = 0.0039 < 0.05$  LOS. Finally, LR has negative and significant effect on LOGAGRIO such that a percentage increase in the LR will lead to a significant reduction of 1.41112 in LOGAGRIO with  $p = 0.0061 < 0.05$  LOS. The Adjusted R<sup>2</sup> of 0.694341 means that about 70% of the variations in LOGAGRIO is explained by the explanatory variables during the period. The D-W Statistic = 1.697599 (approx.. 2) shows that the problem of serial correlation did not affect the results while the F-Stat (1055.275) and its  $p$  value (0.00000 < 0.05 LOS) show that the LR model is both valid and reliable.

#### 4.3 Discussion of Findings

The findings of this research are instructive and need a close examination. In the short run, exchange rate had a negative and significant effect on agricultural output in Nigeria. This can be attributed to the increased cost of imported agricultural inputs such as fertilizers, seeds, and machinery. When the Nigerian Naira depreciates, these inputs become more expensive, reducing farmers' ability to purchase them and thereby lowering agricultural productivity. Moreover, exchange rate volatility creates uncertainty, discouraging investment in agriculture (Umar & Sun, 2016). This impact is particularly pronounced in the short run as farmers struggle to adjust quickly to fluctuating costs (Yousif et al., 2021).

Still in the short run, lending rates have a negative and significant effect on agricultural output. This may be because they increase the cost of borrowing for farmers. When interest rates are high, farmers find it difficult to obtain the necessary capital to invest in modern agricultural techniques, purchase quality seeds, and improve infrastructure. This financial strain limits their productivity and output (Ojeaga & Odejimi, 2014). In the short run, the immediate lack of affordable credit hampers farmers' ability to respond effectively to seasonal demands and market opportunities (Olagunju et al., 2020).

Finally, in the short run trade openness has a positive but insignificant effect on agricultural output in the short run due to several factors. While opening up trade can potentially provide access to new markets, better technologies, and improved farming methods, the immediate benefits may not be realized if the agricultural sector is not competitive or if there are structural inefficiencies. Issues such as poor infrastructure, lack of access to quality inputs, and

inadequate extension services can mitigate the positive impacts of trade openness in the short run (Adewuyi & Akpokodje, 2013). Thus, the sector may not be able to leverage the potential benefits quickly (Bakare, 2022).

Over the long run, a negative and significant effect of the exchange rate on agricultural output is observed as the persistent depreciation of the Naira continues to inflate the costs of imported agricultural inputs. This ongoing financial pressure reduces farmers' profit margins and discourages long-term investments in agricultural improvements. Additionally, the unpredictability of exchange rates over extended periods can lead to a lack of confidence among investors and farmers, further hindering growth and productivity in the sector (Nkalu et al., 2020). Long-term depreciation also affects the purchasing power of consumers, reducing overall demand for agricultural products (Adelakun, 2021).

Secondly, in the long run, high lending rates have a sustained negative and significant effect on agricultural output as they deter long-term investments in the sector. Farmers require affordable credit to invest in technologies, irrigation systems, and other capital-intensive improvements that boost productivity. Persistent high interest rates lead to underinvestment, limiting advancements in farming techniques and infrastructure development (Iheke & Agodike, 2016). This chronic financial burden stifles innovation and growth, keeping agricultural output stagnant (Afolabi, 2021).

Finally, trade openness had a positive but insignificant effect on economic growth on the long run. This suggests that while there may be some benefits from increased access to markets and technology, they are not substantial enough to significantly boost output. This could be due to enduring structural problems such as inadequate infrastructure, poor policy implementation, and lack of access to financial resources. These issues prevent the agricultural sector from fully capitalizing on the potential advantages of trade liberalization (Ogbuabor et al., 2018). Furthermore, without significant improvements in productivity and competitiveness, the positive impacts of trade openness remain limited (Adeola & Evans, 2017).

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## 5. Conclusion and Recommendations

The study investigates the effect of globalization on agricultural output in Nigeria, employing descriptive statistics, correlation analysis, ARDL Bound test for unit root presence, and co-integration tests as preliminary tests methods. The ARDL (Autoregressive Distributed Lag) technique was then used to determine the specific impacts of globalization variables on agricultural output. The analysis indicates that, in the short run, exchange rate volatility negatively and significantly affects agricultural output and the effect of trade openness on agricultural output was positive but statistically insignificant. On the long run, exchange rate volatility continues to have a negative and significant impact on agricultural output, reflecting persistent challenges in managing input costs; high lending rates also have a sustained negative impact on agricultural output in the long run, discouraging long-term investments and innovations in the sector, while similar to the short run, trade openness has a positive but insignificant effect on agricultural output in the long run.

The study concludes that exchange rate stability and lower lending rates are crucial for enhancing agricultural output in Nigeria. While trade openness offers potential benefits, structural reforms are necessary to realize these gains.

This study recommends that in order to mitigate the negative effects of exchange rate volatility on agricultural output in the short run, the Nigerian government should stabilize the exchange rate through effective monetary and fiscal policies. Additionally, promoting local production of agricultural inputs can reduce dependency on imports, thereby insulating the sector from exchange rate fluctuations. Establishing a foreign exchange stabilization fund specifically for agricultural inputs could also help manage short-term volatility. Secondly, to be able to counteract the adverse impact of high lending rates on agricultural output in the short run, it is essential to provide subsidized credit facilities to farmers. The government should collaborate with financial institutions to offer lower interest rates for agricultural loans and create guarantee schemes to reduce the risk for lenders. Expanding microfinance institutions' reach in rural areas can also enhance farmers' access to affordable credit.

Although trade openness has a positive but insignificant effect, the government should invest in improving the competitiveness of the agricultural sector. This includes enhancing infrastructure such as roads and storage facilities, providing training and extension services to farmers, and ensuring access to quality inputs. Policies that facilitate better integration into global value chains can also help farmers benefit more substantially from trade openness in the short run. For the long-term negative effects of exchange rates on agricultural output, Nigeria should focus on diversifying its agricultural sector to reduce dependence on imported inputs. Encouraging research and development in agriculture to develop local substitutes for these inputs is crucial. Additionally, implementing long-term policies that promote currency stability, such as improving the balance of payments and increasing foreign exchange reserves, will be beneficial.

Addressing the negative impact of high lending rates on agricultural output in the long run requires creating a more favorable investment environment. This includes implementing policies that lower the cost of borrowing, such as interest rate caps for agricultural loans and long-term credit schemes. Strengthening agricultural cooperatives can also help pool resources and reduce individual borrowing costs. Investing in financial literacy programs for farmers will enable them to better manage and utilize credit. Moreover, to maximize the long-term benefits of trade openness, the Nigerian government should address structural issues within the agricultural sector. This includes investing in infrastructure, enhancing market access, and improving regulatory frameworks to ensure quality standards. Creating partnerships with international organizations and private sectors can facilitate the transfer of technology and best practices. In all, developing comprehensive agricultural policies that support innovation and sustainability will help the sector fully capitalize on the advantages of trade openness.

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