PROMOTING COCOA EXPORT FOR TRANSFORMATIVE AND SUSTAINABLE AGRICULTURAL GROWTH IN NIGERIA

Udeme Henrietta Ukpe[1], Iheanyi Onuigbo[2]

[1]Department of Agricultural Economics and Extension, Federal University Wukari, P.M.B 1020 Wukari, Taraba State, Nigeria

[1]Corresponding author e-mail address: ukpe@tuwukari.edu.ng

[2]Department of Agricultural Economics, Joseph Sarwuan Tarka University Makurdi, PMB 2373, Makurdi, Benue State, Nigeria

[2]Coauthor's e-mail address: onuigbo44@yahoo.com

Abstract: *This study was carried out to assess whether cocoa export crop could serve as driver for transformative and sustainable agricultural growth in Nigeria. Data were collected from secondary sources. Vector Error correction, impulse response and variance decomposition were used as analytical tools. The results showed that the in the short run the coefficient of determination (R2) was 0.507 indicating that 50.7% of the variation in agricultural growth was explained by cocoa export, exchange rate, government expenditure and labour. There is a positive short run relationship and a negative long run relationship between cocoa export and agricultural growth. Labour exhibits an adverse effect in the short and long run on agricultural growth. Also, the result shows a short and long run positive relationship between exchange rate, government agricultural spending, and agricultural growth. Agricultural growth responded positively to a unit shock in Cocoa export and exchange rate in both the short run and long run. It was recommended that government should be proactive in its responsibilities by increasing budgetary allocation to agriculture and monitoring of its distribution, incentivize local investors and cocoa farmers, put in place viable export policy and appropriate exchange rate policy to stabilize the Nigerian economy. This will restore the place of Nigeria in the competitive cocoa market as well as increase agricultural growth.*

INTRODUCTION

The cocoa sector has the capacity to generate employment opportunities, particularly in rural areas where poverty rates are high. Nigeria is the fourth-largest cocoa producer globally and has the potential to tap into the growing global demand for cocoa and cocoa-derived products (FAO, 2018). By expanding cocoa export, Nigeria can enhance economic growth, reduce dependence on oil revenue, and create opportunities for smallholder farmers. While there is a growing body of literature on cocoa production and adoption in Nigeria, there exists a notable research gap regarding the promotion of cocoa exports for transformative and sustainable agricultural output performance in Nigeria.

While several studies (Ajayi and Ojo, 2019; Osabuohien, 2017; Kehinde, 2022) have addressed the challenges and opportunities in cocoa production, and others (Federal Ministry of Agriculture and Rural Development, 2016; UNDP, 2019) have highlighted policy initiatives and value chain analysis, there is limited empirical research on the practical implications of exports determinants of cocoa such as its output, exchange rate, public agricultural spending and agricultural labour. Therefore, there is a need to ascertain their contribution for the sustainability of the agricultural sector in Nigeria.

Despite its potential, the cocoa export sector in Nigeria faces several challenges that hinder its transformative and sustainable agricultural output performance. For instance, Nigeria primarily exports raw cocoa beans, missing out on

the economic benefits of value-added cocoa products. The lack of processing facilities and infrastructure for cocoa processing hampers the country's ability to compete in the global market (FAO, 2018). The decline has particularly affected the socioeconomic development of the cocoa producing states. The decline in cocoa production is attributed to a myriad of problems such as the ageing of cocoa farmers and cocoa trees, depletion of soil fertility, high pest and disease infestation, poor maintenance of cocoa farms, and lack of credit access, among others (Kehinde and Adeyemo, 2017; Kolawole et al., 2020; Kehinde and Tijani, 2021a; Kehinde and Ogundeji, 2022a; Kehinde, 2022).

Though Nigeria still commands an appreciable share of the cocoa produced from the African continent, evidence over the years had shown a decline in annual output, thereby giving rise to a fall in the fortune of the sub-sector (ICCO, 2016; Daudu et al., 2021). This was consequent upon the closure of the Nigerian Cocoa Marketing Board in the 1980s after which the government's involvement in the cocoa sub-sector was greatly reduced and premium quality was no more rewarded (Adelodun, 2017; Daudu et al., 2021). Earnings from cocoa exports had also gone down in recent times as observed in 2019 when the country recorded export revenue of US$248.5 million depicting a drop of 3.0% from 2018 figure mainly due to the exportation of low-quality cocoa beans (Workman, 2020; Daudu et al., 2021). The International Institute for Tropical Agriculture asserted that Nigerian cocoa farmers produce beans of low quality due to their adherence to primordial production practices and non-compliance to the international specifications (IITA, 2017; Daudu et al., 2021).

Nigeria has been heavily dependent on oil revenue for its economic sustenance, making it highly susceptible to global oil price fluctuations. Diversifying the economy through the promotion of cocoa exports can reduce this dependency, create a more stable revenue stream, and improve economic resilience (World Bank, 2017). The significance of this endeavor becomes evident in the context of Nigeria's economic diversification aspirations (World Bank, 2017). With an overreliance on oil revenue, the need to diversify the economy has never been more pressing, and cocoa exports present a compelling opportunity to achieve this diversification. In a world increasingly attuned to environmental concerns, the sustainability of cocoa production in Nigeria is paramount. Sustainable cocoa farming practices not only safeguard the environment but also align with global consumer preferences for responsibly sourced products (ICO, 2020). Furthermore, the revival of the cocoa sector holds the promise of rural development, job creation, and poverty alleviation (Owusu and Owusu, 2018). By enhancing productivity, improving value chain linkages, and embracing sustainable farming practices, cocoa can become a vehicle for holistic rural transformation.

In the subsequent sections, we provide an overview of cocoa export sector in Africa, present the methodology, results and discussion, and draw conclusions. Through this article, we aim to contribute to the ongoing discourse by assessing the role that cocoa export could play in sustaining and transforming Nigeria's agriculture into a catalyst for poverty alleviation and food security.

Overview of the Cocoa export sector in Africa

Africa has a long history of cocoa production, dating back to the colonial era. Early cultivation of cocoa was concentrated in West Africa, particularly Ghana and Côte d'Ivoire. Today, these two countries remain the largest cocoa producers in Africa and contribute significantly to global cocoa exports (Martin, 2018). However, other African countries, including Nigeria, Cameroon, and Togo, also make substantial contributions to the continent's cocoa industry (Gockowski and Sonwa, 2011). These countries have historically been major cocoa exporters, with Côte d'Ivoire and Ghana being the largest exporters globally (UNCTAD, 2020). The cocoa export sector in Sub-Saharan Africa is primarily focused on the export of raw cocoa beans, with limited value addition and processing activities (Gockowski and Sonwa, 2011). This exposes these countries to price volatility and limits their ability to capture higher-value segments of the cocoa value chain (Schoneveld and Andrianto, 2020).

Cocoa exports play a vital role in the economies of many African countries. The revenue generated from cocoa exports contributes to foreign exchange earnings, employment generation, and poverty reduction (Sarpong et al., 2019). The sector provides income opportunities for millions of smallholder farmers, thereby supporting rural livelihoods and promoting socioeconomic development. Enhancing value addition and processing capacity is crucial for increasing export earnings and improving the competitiveness of Sub-Saharan African countries in the global cocoa market (Schoneveld and Andrianto, 2020). Sustainable cocoa production and certification schemes have gained prominence in recent years, driven by increased consumer demand for ethically sourced and environmentally sustainable cocoa (Schoneveld and Andrianto, 2020).

Government policies and interventions play a crucial role in shaping cocoa exports in Africa. Countries like Ghana and Côte d'Ivoire have implemented cocoa sector reforms, including price stabilization mechanisms, farmer support programs, and investment in research and development (Martin, 2018). These interventions aim to enhance productivity, improve farmer incomes, and strengthen the cocoa value chain.

Sub-Saharan African countries face various challenges in their cocoa export sectors. These include issues related to aging cocoa tree populations, low productivity, pests and diseases, inadequate access to finance and inputs, limited infrastructure (Gockowski and Sonwa, 2011; Schoneveld and Andrianto, 2020; Ahmed et al., 2020). Additionally, climate change poses a significant threat to cocoa production in the region, with rising temperatures and changing rainfall patterns affecting cocoa-growing regions (Schroth et al., 2016). Additionally, issues such as child labor and price volatility pose significant challenges to sustainable cocoa production and ethical supply chains (Martin, 2017).

Despite the challenges, cocoa exports in Sub-Saharan Africa present opportunities for economic growth, poverty reduction, and rural development. Enhancing productivity through improved farming practices, promoting value addition and processing, strengthening farmer support systems, and investing in infrastructure are crucial for realizing the

potential of the cocoa sector (Gockowski and Sonwa, 2011). Furthermore, regional cooperation and coordination among cocoa-producing countries can facilitate knowledge sharing, resource pooling, and joint marketing initiatives (UNCTAD, 2020). Sustainable cocoa production has gained increasing attention, and certifications like Fairtrade, Rainforest Alliance, and UTZ have been introduced to address social, environmental, and economic concerns in the cocoa sector. Several studies have examined the impact of certification schemes on cocoa farmers' livelihoods, market access, and environmental practices (Dzahini-Obiatey et al., 2021; Asare et al., 2020). These certifications aim to improve farming practices, increase farmer incomes, and promote responsible supply chains.

MATERIALS AND METHODS

The Study Area

The study area is Nigeria. Nigeria has an area of 923,768.00 sq. kilometers and lies between latitudes 40 and 140North of the equator and longitudes 30 and 140East of the Greenwich meridian. It is bounded on the West by the Republic of Benin on the North by the Republic of Niger and on the East by the Federal Republic of Cameroun, and on the South by the Nigerian coast- line bathed by the Atlantic Ocean.

Data Collection Method

Annual time series data spanning a period of twenty years (1996-2021) were used for the study. Data on Agricultural productivity and the value of cocoa export measured in Naira was collected from Food and Agriculture Organization of the United Nations (FAO) and United Nations Conference on Trade and Development (UNCTAD). The official exchange rate of Nigeria measured in US dollars was collected from World Bank data base, Government expenditure on agriculture and labour were gotten from National Bureau of statistics and were measured in Naira and number of people employed in the agricultural sector.

Techniques of Data Analysis

To avoid reporting spurious regression findings, a unit root test, called Augmented Dickey-Fuller (ADF) coined by Dickey and Fuller (1981) for testing a stationary time series data was used. The unit root test determines whether the series is stationary at the level, first or second difference. Johansen co-integrating test was carried out to establish the existence of a long run relationship, Vector Error Correction model was used to analyse the short run and long run effects of the determinants of agricultural growth, Variance decomposition and impulse response were applied to determine the contributions of each of the determinants to agricultural growth and the response of agricultural growth to a unit shock of each of the variables respectively.

Models specification

Augmented Dickey Fuller test (ADF)

The Augmented Dickey Fuller (ADF) model with the constant term and trend can be specified as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \beta Y_{t-1} + \sum_{i=1}^{p} \delta_i \, \Delta Y_{t-i} + \varepsilon_t \qquad (1)$$

Where Y is the value of the variable of interest (Agricultural growth, Cocoa export, government expenditures on agriculture, exchange rate and Agricultural labour), α_0 is the constant, α_1 is the coefficient of the trend series, p is the lag order of the autoregressive process, Y_{t-1} is lagged value of order one of Y_{t-1} and ε_t is the error term.

Johansen Cointegration test

Johansen tests assess the null hypothesis H(r) of co-integration rank less than or equal to r among the time series in Y using trace test or max-eigen test. Granger's representation theorem asserts that if the coefficient matrix $\prod$ has reduced rank $r < k$, then there exist $k \ x \ r$ matrices α and β each with rank r such that $\prod = \alpha\beta'$ and $\beta'y_t$ is I(0). A linear combination of two or more I(1) series may be stationary or I(0), in which case the series are co-integrated. The null hypothesis for the Johansen cointegration test (H!: r = 0) implies that co-integration exist, while the alternative (H!: r > 0) means that co-integration does not exist in which case the null hypothesis is rejected. The rejection of the null hypothesis imposes the lagged residual from the co-integrating regression as the error correction term in a Vector Error Correction Model which could be specified thus:

$$\nabla Y_t = \prod Y_{t-1} + \sum_{i=1}^{k-1} \tau_i \nabla Y_{t-1} + u + \qquad (2)$$

∇Y_t = First difference of a () vector of the n variables of interest. $\prod$= (n x n) coefficient matrix associated with lagged values of the endogenous dependent variables, Y_{t-1} = Lagged of Y_t τ = (n x (k − 1) Matrix of short term coefficients u = (n x 1) vector of constant and ε_t= (n x 1) vector of white Noise Residuals.

Vector Error Correction Model (VECM).

The vector error correction (VEC) model is just a special case of the VAR for variables that are stationary in their differences (i.e., I (1)). The VEC can also take into account any cointegrating relationships among the variables. This was applied to investigate on short run interaction causality and the ability to correct long run deviation in the short run. The model is specified thus with the variables of interest.

$$\nabla lnAGRP_{t-1} = \alpha_0 + \sum_{i=1}^{p} a_1 \nabla lnCCEXP_{t-1} + \sum_{i=1}^{p} a_2 \nabla lnEXCH_{t-1} + \sum_{i=1}^{p} a_3 \nabla lnGOVEXP_{t-1} + \sum_{i=1}^{p} \qquad (3)$$

Where:

lnAGRP$_{t-1}$ = Agricultural growth,

lnCCEXP$_{t-1}$ = Value of cocoa export,

lnEXCH$_{t-1}$ = Exchange rate

lnGOVEXP$_{t-1}$ = Government expenditure on Agriculture,

lnLABOR$_{t-1}$ = Value of labour in agriculture

ε_t = Error term

RESULTS AND DISCUSSION

Testing for Stationarity: Unit Root Test Results

The Augmented Dickey Fuller test results presented in table 1 shows that all the variables are not stationary at level hence the null hypothesis that states that Cocoa export, Exchange rate, Government expenditure on agriculture and labour do not influence agricultural production cannot be rejected. This implies that the variables have unit roots. A futher test at first difference of the entire variables rejected the null hypothesis at 1% as the values of ADF t-statistic are greater in absolute term than the critical value. It is therefore concluded that the series of cocoa export, exchange rate, government expenditure on agriculture and labour are integrated of order I(1).

Table 1. Unit Root test Result in Levels and First Difference

	ADF Results				
	At level		At First difference		Decision
Variables	t-statistic	Probability	t-statistic	Probability	I(1)
lnAGRP$_{t-1}$	-3.986764	0.0270	-6.513864	0.0002***	I(1)
lnCCEXP$_{t-1}$	-1.970812	0.5792	-3.120956	0.0420**	I(1)
lnEXCH$_{t-1}$	-2.167521	0.2230	-4.267279	0.0040***	I(1)
lnGOVEXP$_{t-1}$	-0.870443	0.7735	-7.316249	0.0000***	I(1)
lnLABOR$_{t-1}$	-2.470735	0.1376	-13.20043	0.0000***	I(1)

*** indicate stationary at 1% and ** stationary at 5% level of significance respectively

Source: Computed from 2018/2019 Nigeria GHS Data

Co-integration Test Result

The results of the unrestricted co-integration test presented in Table 2 shows the values of Trace statistic to have co-integration in one of the equations at 5% level of significance. This implies the existence of a long run relationship among the variables. The subsequent equations shows the Trace statistic to be less than the critical values indicating the rejection of the hypothesis (H!: r > 0), meaning that co-integration does not exist. This reveals that some variables have a long run relationship with the dependent variable; others exist to correct long run deviations in the short run.

Table 2. Co-integration Rank Test based on Trace Statistic

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 0.05	Prob.**
None *	0.286872	88.342	69.818	0.0000
At most 1	0.269719	12.067	47.856	0.0000
At most 2	0.233880	29.797	59.567	0.0000

Trace statistic test indicates 1 co-integration equation at 0.05 level of significance
This denotes rejection of the hypothesis at the 0.05 level
*MacKinnon-Haug-Michelis (1999) p-values

Source: Authors computation using E-Views

Assessing the Factors affecting Agricultural Growth in the Long run

The VECM was employed in order to analyse the long run and short run dynamics of the effects of the factors that promote agricultural growth.

The result shows that in the long run, cocoa export, exchange rate, government agricultural spending and labour were the variables that significantly affected agricultural production. Specifically, the coefficient of Exchange rate (1.02) and Government agricultural spending (1.87) were positive and significant at 1%. This implies that, a unit increase in exchange rate and public agricultural spending will increase agricultural growth by 1.87% and1.02% respectively. This could be due to the various agricultural targeted programs set up by the government to sustain the agricultural sector. This finding is in line with Setshedi and Mosikari (2019) who found a positive relationship between government expenditure and agricultural productivity. Similarly, exchange rate increase stimulates export which in turn generates foreign exchange. This finding is contrary with Oloukoi (2020) who found a negative relationship between exchange rate and agricultural output in Nigeria. In contrast, the coefficients of cocoa export (-0.05) and labour (-11.4) were negative and significant and at 1%. This implies that a unit increase in the value of cocoa export and labour will decrease agricultural growth by 5% and 11.4% respectively in the long run. The negative effects of cocoa export could be due to the fact that cocoa industry in Africa and especially in Nigeria faces various challenges that impact its production and export potential. These challenges include environmental factors

Table 3. Factors affecting Agricultural Growth in the Long run

Variables	Coefficients	t- Value
LNCCOAEX	-0.055002***	-6.2
LNEXCH	1.020757***	11.6
LNGOVEXP	1.872895***	22.2
LNLABOUR	-11.44490***	-19.5
C	140.1533	7.15

*** Significant at 1%

(climate change, pests, and diseases), low productivity, aging cocoa trees, limited access to finance and technology, and inadequate infrastructure (Ahmed et al., 2020). The negative effect of labour on agricultural growth might be due to rural urban migration by the active labour force leaving the elderly and the aging population in cocoa farming and export. This finding is contrary to the Arikewuyo et al. (2021) who found that employment in the agricultural sector is positively related to agricultural output in Sub-Saharan Africa.

Factors affecting Agricultural Growth in the short run

The result showed that the coefficient of determination (R2) was 0.507 indicating that 50.7% of the variation in agricultural growth was explained by cocoa export, exchange rate, government expenditure and labour. The result also shows that 'F' Statistic (2.05) was significant at 5% indicating the goodness of fit and the overall significance of the variables used in the model. The result further revealed that in the short run, the previous year's cocoa export and labour significantly affected agricultural growth. Specifically, the coefficient of Cocoa export (0.26) was positive and significant at 1% while labour (-6.11) was negative and significant at 10%. The positive effect of cocoa export indicates that a unit increase in cocoa export will increase agricultural growth by 0.26% in the short run. This could be due to accruals from foreign exchange earned from cocoa export ploughed back into agriculture. Another reason may be due to the positive externalities which accrue to exporting countries such as increasing return to scale, increased innovations and other efficiency gains all of which can increase agricultural growth. This result agrees with the findings of Noula et al. (2013) who found that cocoa export enhance agricultural growth through increased competition, economies of scale and increased capacity utilization. In contrast, the coefficient of labour (-6.11) was negative and significant at 10%. This result indicates that a unit increase in labour will decrease agricultural growth by 6.1% in the short run. This could be as a result of the un-mechanized nature of farming in Nigeria where drudgery impedes youth participation in agriculture.

Table 4. Short Run Determinants of Agricultural growth

Error Correction:	D(AGPRO)	D(CCEX)	D(EXCH)	D(GEXP)	D(LABOR)
D(AGPRO(-1))	-0.365066 [-1.61169]	-0.326434 [-0.42198]	0.012686 [0.15573]	0.183830 [0.85832]	0.009250 [0.83940]
D(CCEX(-1))	0.261352 [2.59849]***	0.592767 [1.72569]	0.004664 [0.12893]	0.106080 [1.11545]	0.004131 [0.84416]
D(EXCH(-1))	-0.577479 [-1.08588]	-2.913111 [-1.60393]	-0.135753 [-0.70978]	-0.435016 [-0.86512]	-0.031216 [-1.20648]
D(GEXP(-1))	0.157522 [0.55175]	0.068845 [0.07061]	0.175195 [1.70628]	0.050994 [0.18891]	0.026673 [1.92031]
D(LABOR(-1))	-6.113570 [-1.87552]*	-11.91003 [-1.06985]	3.138558 [2.67721]	-5.269297 [-1.70963]	-0.617061 [-3.89093]***
C	0.203206 [1.05294]	0.859333 [1.30380]	0.029603 [0.42650]	0.291713 [1.59862]	0.049433 [5.26485]
R-squared	0.507107	0.329060	0.674549	0.337258	0.685787
Adj. R-squared	0.260660	-0.006410	0.511824	0.005887	0.528681
Sum sq. resids	4.918447	57.36706	0.636174	4.397240	0.011642
F-statistic	2.057672	0.980891	4.145324	1.017765	4.365112

***, and * Significant at 1% and 10% respectively
N.B. Values in brackets are t statistics

Impulse responses of Agricultural growth to unit shock of Variables of interest

The result of the study revealed that agricultural growth responded positively to its unit shock in both the long run (10years) and short run (5yrs). Also, Agricultural growth responded positively to a unit shock in Cocoa export and exchange rate in both the short run (5yrs) and long run (10years). In contrast, agricultural growths responded negatively to a unit shock in Government agricultural spending and labour both in the short run (5yrs) and long run (10years). This implies that the lesser the government spend on the agricultural sector; the lesser will be the growth of the sector. The negative response on labour could be explained by the rural urban migration of youth endemic in the country and the preponderance of aging population in agriculture.

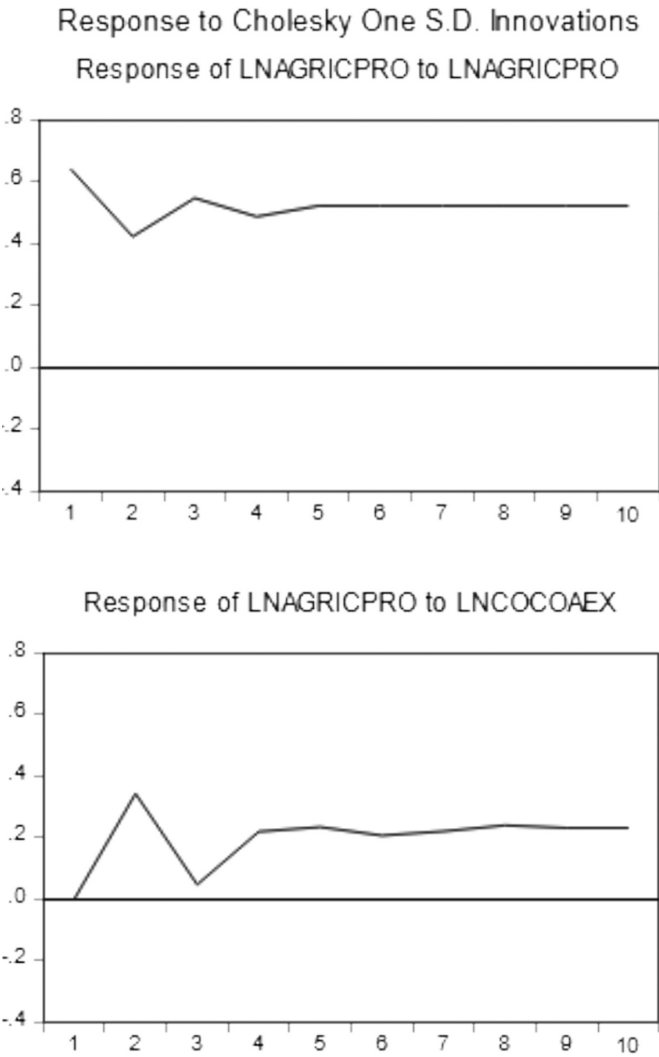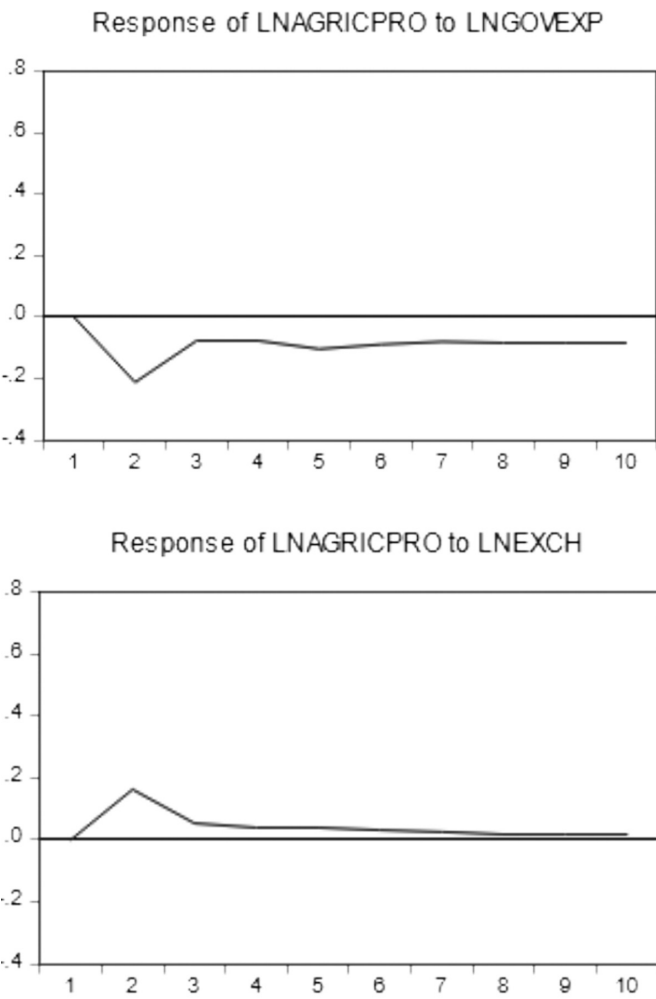**Figure 1. Impulse responses of Agricultural growth to unit shock of Variables of interest**

Response of LNAGRICPRO to LNGOVEXP

Response of LNAGRICPRO to LNEXCH

Variance Decomposition Results of Agricultural growth and variables of interest

The result also showed that agricultural growth will contribute to itself for 81.2% in the short run and 81.7% in the long run. Cocoa Export will contribute to agricultural growth for 13.0% in the short run and 14.2% in the long run. Exchange rate will contribute to agricultural growth by 1.9% in the short run and 1.1% in the long run. Government agricultural spending will contribute to agricultural growth for 3.9% in the short run and 3.1% in the long run. labour will contribute to agricultural growth for 0.89% in the short run and 1.6% in the long run. Among the variables used, cocoa export was found to have the highest contribution to agricultural growth in Nigeria both in the short run and the long run.

CONCLUSION

This study was carried out to assess whether cocoa export crop could serve as driver for transformative and sustainable agricultural growth in Nigeria. It was found a positive short run relationship and a negative long run relationship exist between cocoa export and agricultural growth. Labour exhibits an adverse effect in the short and long run on agricultural growth. Also, the result shows a short and long run positive relationship between exchange rate, government agricultural spending, and agricultural growth. The results also showed that Agricultural growth responded positively to a unit shock in Cocoa export and exchange rate in both the short run and long run. It was recommended that government should be proactive in its responsibilities by increasing budgetary allocation to agriculture and monitoring of its distribution, incentivize local investors and cocoa farmers, put in place viable export policy and appropriate exchange rate policy to stabilize the Nigerian economy. This will restore the place of Nigeria in the competitive cocoa market as well as increase agricultural growth. There is also a need to set up measures such as training, and land access to attract youth in Cocoa agribusiness given that they could provide energetic and skillful labour to raise the productivity of the commodity.

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Table 5. Variance Decomposition Results of Agricultural growth and variables of interest

Period	S.E.	LNAGRI PRO	LNCCEXP	LNEXCH	LNGOVEXP	LNLABOUR
5yrs	1.311194	81.19003	12.97636	1.896031	3.928617	0.008963
10yrs	1.839057	81.66542	14.21733	1.045462	3.055707	0.016087

Source: Authors computation using E-Views

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