CROP PRODUCTION AND EXPORT DIVERSIFICATION IN NIGERIA

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ABSTRACT
This research work examined the crop production and export diversification in Nigeria for the period of 1985 to 2019. Data were collected from secondary sources of Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics, and World Bank Development Indicator. The specific objective of the study is to examine the trends of Crop Production and Export Diversification and to determine the significance of Crop Production and Export Diversification in Nigeria. The study is hinged on theory of International Trade. The study employed Augmented Dickey-Fuller unit test, Johansen Co integration test and Ordinary Least Square technique to test the hypothesis. The result revealed that Fertilize Consumption, Agricultural machinery and tractor, Government expenditure on Agriculture exhibit a positive effect and significant relationship on export diversification in Nigeria while crop production and labor in agriculture exert a negative effect and significant relationship on export diversification. Based on the result, the study recommended among others that agricultural policy should be purpose driven towards the achievement of export diversification. This can be achieved by employing selective-sectoral agricultural policy measures in accelerating investment in various non-oil sectors of the economy.

Keywords: Crop Production, Export Diversification, Nigeria
JEL Classification Codes: Q13, Q17, Q18

1.   INTRODUCTION

From the standpoint of international trade, diversity of exports is viewed as necessary to insulate Low Income Countries (LICs) from external shocks and enable them to record any meaningful gains from trading with other countries (Kaulich, 2012). Secondly, it is seen as a good strategy that will enable these LICs to record greater earnings from external trade thereby advancing their economic progress (Sannassee, Seetanah&Lamport, 2014). Besides, in a bid to increase output for export, production for domestic consumption will also invariably be increased. However, from the available empirical evidence, a key issue arises regarding the actual nature of the relationship between export diversification and crop production. Imbs and Wacziarg (2003) found that this relationship between export diversification and Crop Production followed an inverted U-curve pattern, implying that at lower levels of GDP per capita, the relationship between export diversification and crop production is positive, while at higher levels of GDP per capita, the relationship is negative. Some other studies such as those of Kalemli-Ozcan, Sorensen and Yosha (2003), Koren and Tenreyro (2004) have confirmed the idea of an inverted U-curve relationship, while others such as that of De benedictus, Gallegati and Tamberi, (2007) have refuted the idea of the inverted U-curve; arguing instead that the relationship follows an inverted L-curve pattern.

For Low Income countries (LICs) however, Sannassee, Seetenah and Lamport (2014) suggested that the inverted U-curve relationship between export diversification and crop production does not apply, but rather, the relationship is a positive rising curve. This implies that as far as LICs are concerned, export diversification is beneficial to crop production and these benefits may only need to be re-evaluated when these countries transit from Low-income through Mid-income to High-income status. Meanwhile, Papageorgou and Spatafora (2012) identified the turning point of the inverted U-curve relationship (i.e. the transition point from Low-income to High-income status) to be a GDP Per Capita of around $25,000 to $30,000. But considering that Nigeria's GDP Per Capita since 1981 has never risen above $2,500, it means that the relationship between export diversification and crop production for Nigeria would most likely be a positive one.

Agricultural sector has been the leading provider of employment in Nigeria since the 60's and 70's, when the sector provided employment for more than 70 percent of the Nigerian population. Unfortunately, in the wake of oil discovery, the attention on this sector of the economy was gradually and myopically shifted to the oil sector where employment opportunities were very low and the traditional agricultural exports have been on a progressive decline. Regrettably, the scenario has given rise to acute unemployment as oil sector could only employ limited number of the population and worse still, only expert. Most previous studies on Nigeria on the subject of export diversification and crop production such as that of Suberu, Ajala, Akande and Adeyinka (2015) have employed qualitative rather than quantitative methods. Others like that of Esu and Udonwa (2015) simply employed disaggregated sectorial exports data to capture the degree of exports diversity.

The index analysis which is a direct measure of export diversification would better show the impact of export diversification on crop production. Specifically, the size and sign of its coefficient can be interpreted more easily, while statistical testing of hypothesis regarding the statistical significance of export diversification can also be achieved more clearly, compared to the use of disaggregated sectorial exports where the actual impact of diversification on crop production would have to be inferred from the contributions of the individual export sectors to growth. This study thus, verified the relationship between Agricultural crop production, export diversification and economic growth in Nigeria using the IMF export diversification index.

The difficulties such as: hunger and starvation due to relegation of agriculture to the background, high dependent on importation of required raw materials for production, large number of unemployed youths that agricultural sector face led to decline in contribution of the sector to the Nigerian economy. This has made Nigerian government to be able to come up with many policy decisions and programs to improve agricultural production in Nigeria. Harnessing Nigeria agricultural endowment wisely will help diversify the economy and reduce over reliance on the oil sector and importation. Nigeria economy has been inconsistent due to unstable oil price and continuous rise in the price of import goods. All these challenges have undesirable effect in Nigeria balance of payment, employment level and other sectors productivity as well as purchasing power of the people (Oyinbo, et. al. 2014). The main objective of this study is to examine the effect of agricultural crop production and export diversification on economic growth in Nigeria. Specifically, this study was designed to; (i) to examine the trends of crop production and export diversification in Nigeria and (ii) to investigate the impact of crop production on export diversification of Nigeria.

2.   **LITERATURE REVIEW**

The study is hinged on Heckscher-Ohlin model, this is because the heckscher-Ohlin model was developed as a reaction to omissions and deficiencies in the Ricardian model and he focused on how countries can achieve efficient gain from international trade based on the theory of comparative advantages. The Heckscher-Ohlin model focused on international trade which was developed by two neoclassical Nobel Prize winner economists called Eli Hechscher and Bertil Ohlin (Krugman, 2012). Like the RicardianModel, trade occurs because of countries' comparative advantages in production and trade off goods based on their difference in factors of production (both Labor force and the technology) they are using on production. The main contents of the theory stated that the country that is abundant in a factor exports the good whose production is intensive in those factors. However, the traditional trade theories seem to contradict with the current theories which encourage diversification of export products. Ricardo and some other traditional economists wrote theories of comparative advantages. Those traditional trade theories encourage the countries to specialize their export products based on their comparative advantage.

According to the above theories, developing countries have comparative advantages on production of agricultural and mineral products, but this products showing high fluctuation in their prices in international markets and also the production of agricultural products isdepending on favorable weather condition. So, expanding baskets of export commodities help to solve the problems related to price instability and problems related to unfavorable weather condition in order to secure stable export revenues earning. As the price of some products fall in the international markets, at least they can compensate by

other commodities and can keep stable export earnings. In addition to maintaining stable export revenues earning, export product diversification also helps to minimize the risks related to politics and economics. Therefore, the above theory will be useful for this work especially because Nigeria is a developing Nation.

3.   **EMPIRICAL REVIEW**

Osabohien et al (2019) examined the effect of agricultural exports and economic growth in Nigeria covering the period of 1986 to 2016. This study used the Autoregressive Distribution Lag (ARDL) econometric technique to analyze the long run relationship and the impact of agricultural exports on Nigeria's economic growth. Economicgrowth is the dependent variable, and is a proxy for the real gross domestic product, theexplanatory variables include: agricultural export, foreign direct investment, inflation rate andthe labor force. The results from the ARDL technique revealed that agricultural exportssignificantly affect Nigeria's economic growth.

Duru and Ehidiamhen (2018) examined the impact of export diversification on economic growth in Nigeria from 1980 to 2016. The ARDL bound testing approach to cointegration was employed as a methodology for the study. The results showed that export diversification had a positive and insignificant relationship with economic growth in Nigeria. However, exports of goods and services and the growth rate of exports had a positive and statistically significant effect on the country's economic growth, whereas openness to trade had a negative and insignificant influence. Furthermore, investment proxied by gross fixed capital formation exerted a positive and statistically significant relationship with economic growth.

Omoyiwola, Gylych and Kemal (2017) investigated the impact of Agricultural output on economic growth in Nigeria. The Ordinary Least Square regression method is used to analyze the data. The results reveal that a positive and significant relationship exists between gross domestic product (GDP) and agricultural output in Nigeria. Agricultural sector is estimated to contribute 2.247 percent variation in gross domestic product (GDP) from 1981 to 2014 in Nigeria. The Agricultural sector suffers neglect during the hey-days of the oil boom in the 1970s. In order to improve agriculture, government should ensure special incentives to farmers, provide adequate funding, and also provide infrastructural facilities such as good roads, pipe borne water and electricity.

In the study of Kamil, Ugural, Bekun (2017), examined the impact of agricultural sector on the economic growth of Nigeria, using time series data from 1981 to 2013. Findings revealed that real gross domestic product, agricultural output and oil rents have a long-run equilibrium relationship. Vector error correction model result shows that, the speed of adjustment of the variables towards their long-run equilibrium path was low, though agricultural output had a positive impact on economic growth.

Azuh and Nwankpa (2017) examined the agricultural transformation via-a-vis hunger and poverty eradication as a means of sustaining economic growth and development in Nigeria. The study reported that about 80 percent of Nigerians live in rural areas and agricultural sector remains the main provider of livelihood for most rural dwellers and a major contributor to Nigeria growth rate besides oil and gas sector.

Verter, Becvawva (2016) examined the Impact of Agricultural Exports on Economic Growth in Nigeria. This paper investigates the impact of agricultural exports on economic growth in Nigeria using OLS regression, Granger causality, Impulse Response Function and Variance Decomposition approaches. Both the OLS regression and Granger causality results support the hypothesis that agricultural exports- led economic growth in Nigeria. The results, however, show an inverse relationship between the agricultural degree of openness and economic growth in the country. Impulse Response Function results fluctuate and reveal an upward and downward shocks from agricultural export to economic growth in the country. The Variance Decomposition results also show that a shock to agricultural exports can contribute to the fluctuation in the variance of economic growth in the long run.

Godwin and Ubong (2015) using the error correction mechanism (ECM) revealed the extent to which export diversification can influence economic growth in Nigeria covering the period of 1980 to 2010. The study employed vector error correction model to determine the effect of export diversification and possible factors on economic growth. The results of the study showed that Nigeria could exploit from her untapped trade potentials for sustained gains both in the short-run and long-run. The results further indicate that by diversifying the economy, encouraging large scale industrialization of the non-oil sector,

emphasizing deepening technology in trade and investment and an improvement in agricultural sub-sector among other factor, will further enhance sustainability in growth.

4.   METHODOLOGY

The study employed the pre-test of unit root, and analytical technique of Johansen co-integration test and Ordinary Least Squares (OLS). The unit root test used in this study is the Augmented Dickey-fuller (ADF). Augmented Dickey-fuller test relies on rejecting a null hypothesis of unit root in favour of the alternative hypothesis of stationary. Co-Integration Test of Johansen's procedure was used to determine whether or not the two variables are co-integrated.

Model Specification
The model for this study took clue from the work of Oguwuike Wisdom Tobechi (1981-2016) who examined the effect of Agricultural output on economic growth in Nigeria. However, in order to achieve the objective of this study the above model was modified and the functional form is started below;
EXPD=f(CrPI,FER,AGM,AGL,AGX)…………..1
The econometrics form of the model is expressed in equation 2;
$LnEXPD = \alpha_0 + \beta_1 LnCrPI + \beta_2 LnFER + \beta_3 LnAGM + \beta_4 LnAGL + \beta_5 LnAGX + \mu_{i}$………2
Where: EXPD = Export diversification index, CrPI = Crop production, FER = Fertilizer consumption, AGM = Agricultural machinery and tractor, AGL = Labour in agriculture, AGX = Government expenditure in agriculture, error term.

5.   RESULTS AND DISCUSSION

Trend Analysis

Figure 1: *Trends of Agricultural Expenditure and Export Diversification Index in Nigeria*
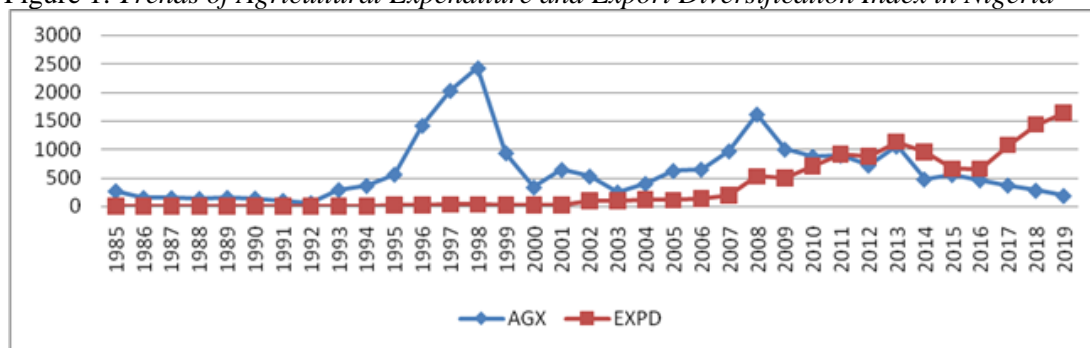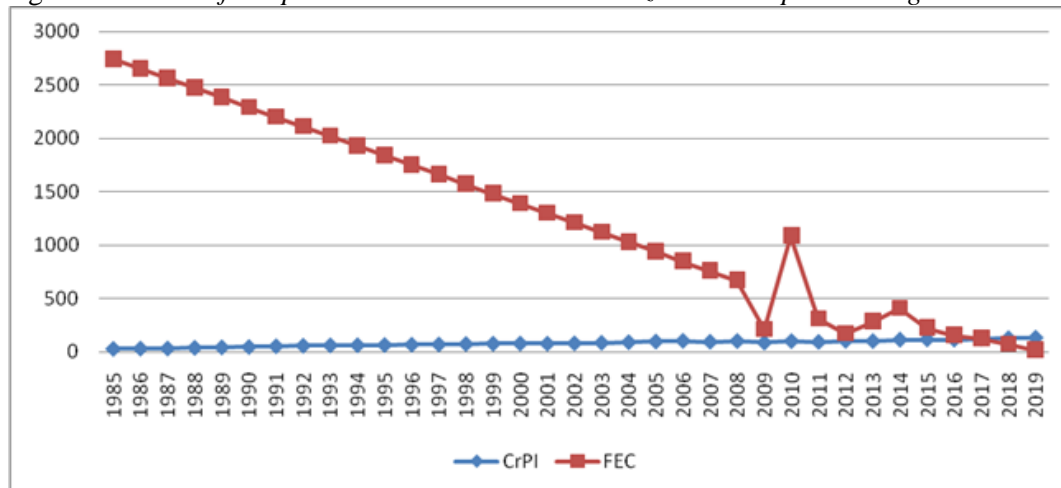

Source: Author's computation using excel

From the Agricultural expenditure index plotted in Figure 1 above, it is observed that the agricultural expenditure decreases from its initial state 296.66 in 1985 to 100.91 in 1992 and increased in small proportion in 1993, 1994 and 1995. This is due to the emergence of oil as a major source of government revenue and foreign exchange thus the Agricultural sector was neglected and hence led to the decline in Agricultural expenditure. From the figure above we can also deduce that agricultural expenditure

was highest in 1998 (2,426.22) and lowest in 1992 (60.69). The total federal expenditure that was allotted to agriculture during 1985 to 2011 was less than 4% (CBN, 2010; JFR, 2012). Afterwards, the agricultural expenditure index rose to 1,418.46, 2031.06 and further to 2,426.22 in 1996, 1997 and 1998 respectively. While for export diversification index we can infer that export diversification index have been increasing marginally from 0.5 in 1985 to 34.1 in 1998 before decreasing to 19.5 the following year and rose again marginally to 24.8 in 2000 to 913.5 in 2011 before decreasing 34.2 the following year there after it increased to 1,130.2 before decreasing in the 3 years (2014, 2015, 2016) before finally increasing marginally in the last 3 years by 3% growth rate. Hence, it is also worthy of emphasis that the absence of export diversification reduced the potentials contribution of other sectors (Non-oil sector) of the economy to the foreign exchange earnings of the Nigeria government. From figure 1, it is observed that with exception to the period 1985 to 1994 the revenue contribution of the non-oil sector lagged behind the revenue contribution of the oil sector.Owing to the dismal performance of the Nigerian economy and the poor performance of the non-oil sectors, attempts at diversifying the economy has resulted in the initiation of various monetary policies.

Figure 2: *Trends of Crop Production Index and Fertilizer Consumption in Nigeria*

Source: Author's computation using excel

Figure 2 above present trends of crop production index and fertilizer consumption in Nigeria for the period of 1985 to 2019. From the crop production index plotted in figure 2 above, it is observed that trends of crop production index increased marginally from 30.4 in 1985 to 106.85 in 2006. However, there was a sharp fluctuation from 2006 to 2013. From the figure we can see that in 2019, crop production index for Nigeria was 136.022 and crop production index of Nigeria increased from 30.4 index in 1985 to 136.022 index in 2019 growing at an average annual rate of 3.31 percent. The latest value for crop production index in Nigeria was 136.022 as of 2019. And over the past 34 years, the value for these indicators has fluctuated between 104.28 in 2013to 106.85 in 2006.

While for fertilizer consumption index in Nigeria for the period of 1985 to 2019 in figure 3 showsthat fertilizer consumption pattern in Nigeria decreased or declined marginally from 2741.127 in 1985 to 213.5078 in 2009. Although Nigeria fertilizer consumption fluctuated substantially in recent years, it tended to increase through 2010 to 2015 period ending at 5.5 kilograms per hectare in 2015. Several reasons have been advanced for low fertilizer usage in the country but the most constraining factor as identified by elaborate survey of extension agents' perception of factors constraining fertilizer uptake by farmers in Nigeria is the fact that the fertilizer didn't arrive at the right time. About 60% of the extension agents interviewed identified lateness in supply as the major factor constrained farmer's usage of fertilizer as against 55% that cited credit as a major constrain. Surprisingly, only about 11% of the extension agents interviewed perceived high prices of fertilizer as the main limiting factor.During 1985 to 2019 period, the average quantity of fertilizer consumed in Nigeria was about 252,000 nutrients metric tons per year (mtpy) with a high and low that oscillated between 98,000 mtpy in 2019 and about 278,000 mtpy in 1985. Despite policies, programs and incentives in support of fertilizer usage for agricultural development, Nigeria falls short of expectations in terms of fertilizer application rates. And Nigeria is below the 2009 regional average of 40kg nutrients/ha and in relation to the actual needs to sustain agricultural production and development.

Table 1: Stationarity Test Result

Variable	ADF statistic At level (Constant & Trend)	Probability	ADF statistics 1st diff. (Constant & Trend)	Probability	Order of Integration
EXPD	-1.503984	0.5195	-6.206908	0.0000	I(1)
CrPI	-3.739732	0.0079	-	-	I(0)
FER	3.006949	1.0000	-7.296149	0.0000	I(1)
AGM	-4.245458	0.0021	-	-	I(0)
AGL	-2.790840	0.0702	-	-	I(0)
AGX	-1.706757	0.4189	-5.402091	0.0001	I(1)

Source: *Extract from E-view output 10, 2021*

From the unit root obtained CrPI, AGM and AGL are stationary at levels whereas EXPD, FER and AGX are stationary at 1st difference. This decision was made because of their probability value are less than 1%, 5% and 10% at the critical value.

Johansen Co integration Test

The co-integration test ascertains the variable that possesses ample long run relationship with the dependent variable. The necessary condition for a co-integration test is that the data tested is at least unit root at level. This is because if the series are stationary at level, a standard regression could be carried out, as there is no risk of false or possible error regression. The test is simply to ascertain the fitness of the variables for the model before the data is subjected to the regression proper (producing the ordinary least square regression results). The co-integration was carried out using the Johansen co integration and the result reveal that there is joint association between the variables under consideration.

Table 2 Result of Unrestricted Co-integration Rank Test (Trace)

No. of CE(s)	Eigen Value	Trace Statistics	5% Critical Value	Prob***
None *	0.856530	127.7188	95.75366	0.0001
At most 1	0.570215	63.64507	69.81889	0.1408
At most 2	0.435037	35.77759	47.85613	0.4076
At most 3	0.248698	16.93473	29.79707	0.6449
At most 4	0.163823	7.498476	15.49471	0.5205
At most 5	0.047163	1.594271	3.841466	0.2067

Source: *Author's compilation from E-views 10*

Trace test indicates 5 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 3Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

No. of CE(s)	Eigen Value	Trace Statistics	5% Critical Value	Prob***
None *	0.856530	64.07371	40.07757	0.0000
At most 1	0.570215	27.86748	33.87687	0.2197
At most 2	0.435037	18.84286	27.58434	0.4267
At most 3	0.248698	9.436253	21.13162	0.7958
At most 4	0.163823	5.904205	14.26460	0.6255
At most 5	0.047163	1.594271	3.841466	0.2067

Source: *Author's compilation from E-views 10*
Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level

Table 4
Regression Result

Variables	Coefficient	Std. Error	T-Stat.	Prob. Values
C	-74.53890	46.61873	-1.598905	0.1207
CrPI	-1.053986	1.101561	-0.956811	0.3466
FER	0.104436	0.153636	0.679761	0.5020
AGM	8.504152	1.229773	6.915223	0.0000
AGL	-0.248898	3.312838	-0.075131	0.9406

AGX	0.218613	0.099014	2.207912	0.0353

$R^2 = 0.978726$ ADJUSTED $R^2 = 0.975058$ F-Statistic = 266.8327

Prob(F-statistic) = 0.000000   Durbin-Watson stat = 1.247348

Source: *Extract from E-view output 10, 2021.*

From the presentation and analysis of results, it was revealed that crop production index plotted in Figure 2 above shows that trends of crop production index increased marginally from 30.4 in 1985 to 106.85 in 2006. However, there was a sharp fluctuation from 2006 to 2013. The dominance of agriculture over the period could be attributed to the focused regional policies that were based on commodity comparative advantage as observed by Esu and Udonwa (2015). While for export diversification index from figure 1 above, it is observed that with exception to the period 1985 to 1994 the revenue contribution of the non-oil sector lagged behind the revenue contribution of the oil sector. Owing to the dismal performance of the Nigerian economy and the poor performance of the non-oil sectors, attempts at diversifying the economy has resulted in the initiation of various monetary policies. And the extent to which monetary policy have influenced export diversification in Nigeria has not been explored by previous indigenous studies (see Esu and Udonwa, 2015; Chimobi and Uche, 2010).

Also it was revealed that crop production had insignificant negative impact on export diversification in Nigeria. This implied that an increase in crop production brought about decrease in export diversification in Nigeria within the study period. Also, the result revealed that fertilizer consumption had insignificant positive impact on export diversification in Nigeria. This implied that an increase in fertilizer consumption brought about increase in export diversification in Nigeria within the study period. The result also showed that agricultural machinery had significant positive impact on export diversification in Nigeria. This implied that an increase in agricultural machinery brought about increase in export diversification in Nigeria within the study period.

Furthermore, the result revealed that labor in agriculture had insignificant negative impact on export diversification in Nigeria. This implied that an increase in labor in agriculture brought about decrease in export diversification in Nigeria within the study period. Lastly, the result also showed that government expenditure on agriculture had significant positive impact on export diversification in Nigeria. This implied that an increase in government expenditure on agriculture brought about increase in export diversification in Nigeria within the study period.

The coefficient of determination (R^2) is 0.97. It shows that 97 percent variation in Export Diversification is caused by the variations in Crop production (CrPI), Fertilizer Consumption (FEC), Agricultural machinery (AGM), Labour in Agricultural (AGL), Government Expenditure on Agriculture (AGX). It then means that the other 3 percent of changes in Export Diversification is caused by other factors that are not included in the model but captured within the stochastic or error term.

6. CONCLUSION AND RECOMMENDATIONS

This study examined the impact of crop production on export diversification in Nigeria economy during the period of 1985 - 2019. For the past decade, the relationship between crop production and export diversification in Nigeria has been a topic of sustained interest and controversy in economic growth literature. This study improved on previous studies done on the Nigeria economy by suggesting a reasonable approach to re-investigate the crop production and export diversification nexus. The study concluded that crop production has not played a direct fundamental role in the enhancement of export diversification in Nigeria. It is therefore the recommendation of this study that the government should vigorously pursue the diversification of Nigeria's exports away from oil through availability and subsidization of agricultural inputs for farmers in order to enhance productivity for domestic consumptionand to serve as catalyst for export promotion. Nigerian government should create secure and enabling environment for commercial farming which will encourage both local and foreign investors to invest in agriculture in the country. There should be workable and lasting solution towards resolution of crisis between farmers and herder which will

in long run stimulate export trade. Nigeria government should put good structure in place particularly in agricultural machinery that allows better and higher agricultural output. Agricultural products should not be allowed to waste but should be channeled into manufacturing industry as raw materials for production of other consumer products for revenue and foreign exchange earnings.

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