The Impact of Agricultural Sector Development on Employment in Nigeria

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Abstract: *This study examined the nexus between agricultural sector development and employment in Nigeria for the period 1970 to 2022. The Johanson Cointegration technique was used to establish the cointegrating relationship among the variables. It was revealed that long run relationship exists among the variables in the estimated model. The results of the Error Correction Mechanism showed that there is a positive and significant relationship between agricultural sector development and employment in Nigeria. It is concluded from the findings that agricultural sector development has a positive and significant impact on employment in Nigeria. The study recommends that there should more public-private partnership in the agricultural sector so that the sector can be developed rapidly through the supply of inputs, finance, infrastructures, market access among others to provide the linkages to the industrial sector so as to create the required employment in agricultural, industrial and other sectors of the economy. More*

funds should be injected into the agricultural sector to modernize the sector so that it can be made attractive to unemployed graduates to go into small and medium scale enterprises which is regarded as a veritable source of employment generation globally. Government should ban food import, backed by right policies to encourage local food production and processing of our local agricultural products.

Keywords: agricultural sector development, employment, granger causality, ECM, Nigeria.

INTRODUCTION

Agricultural sector development involves those programmes and policies of the government in the agricultural sector that transforms the sector into an innovative, commercially oriented, competitive and modernized industry that will contribute to poverty reduction, improve food security as well as employment generation. This means that Agriculture is the mainstay of many economies and the sector is considered a catalyst for the overall development of any nation. Thus, the development of a stable economy goes hand in hand with agricultural sector development. It is thus a critical sector that drives the economic development and industrialization processes of the developing nation, and also helps in boosting the level of employment. Broadly speaking, the menace of unemployment among graduates and the desire to examine the role of agricultural sector development in boosting or creating employment opportunities for the teeming unemployed graduates in Nigeria motivated this research. Besides the employment prospect of the agricultural sector, its' development is critically important for ensuring food security, income and for stimulating industrialization and overall economic development of the country (Fasoranti, 2006; Dikeogu-Okoroigwe *et al.* (2024).

Development economists have always assigned agricultural sector as a central place in the development process. However, the understanding of that role has evolved overtime. Early development theorists emphasized industrialization, though they counted on agriculture to provide the necessary output of food and raw materials, along with the labour force that would gradually be absorbed by industry.

The industrial revolution of the Nineteenth century which catapulted the agrarian economies of most countries of Europe got the impetus in agriculture (Fasoranti, 2006). Indeed, the importance of agriculture in any nation's economy cannot be over emphasized. For instance, in United States of America, agriculture contributes about 1.1 percent of the country's gross domestic product. Agriculture contributes 13 percent of the Chinese GDP, 2.6 percent in Australia, 9 percent in South Africa, 2.5 percent in

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Israel, 12 percent in Australia, 9 percent in Argentina, 13.5 percent in Egypt and in Nigeria it contributes 21.21 percent of their gross domestic product respectively. Similarly, agriculture provides major source of employment in most developing countries, accounting for 25 percent of the work force in Brazil, 32 percent in Egypt, 3.7 percent in Israel, and 70 percent in Nigeria (Ogbalubi & Wokocha, 2013 and CBN, 2023). The above statistics is an indication that the more developed a country is the lower the contribution of agriculture to gross domestic product. This is because in the advanced economies it is the industrial sector that has the larger contribution to gross domestic product (Owan *et al.,* 2024).

In practical terms, agriculture has worked a tremendous miracle in countries like Mexico, India and China where the Green Revolution is one of the great success stories of modern times. It is the major contributor to the export –led growth pattern of a country like Taiwan which was able to attain notable increases in per capita GNP. Thus, the importance of the agricultural sector in generating employment and stimulating overall economic development in a developing country such as Nigeria cannot be undermined.

The agricultural sector after independence, dominated the Nigerian economy, such that the development of the region was hinged on the sector alone. Agriculture accounted for about two-thirds of the Gross Domestic Product. Agriculture was traditionally the main source of livelihood of the people. It provides the means of livelihood and a major source of raw materials for the agro-allied industries and potent source of the much-needed foreign exchange (Awokuse, 2008).

However, over the years, the sector has witnessed rapid decline in its role and contribution to national development. Farm implements have been abandoned in pursuit of the black gold. This situation started with the ''Oil boom'' which led to the rapid decline of the Agricultural sector (Falola & Haton, 2008). Consequently, Nigeria became a major importer of agricultural products as against its earlier position as a major exporter. This led to a decline of the economically active population in agriculture in Nigeria as well as an increase in the level of unemployment in the sector.

Statement of the problem

The present economic situation in Nigeria has been linked to the neglect and poor performance of the agricultural sector due to the over reliance on the oil sector, which impact negatively on productivity in the agricultural sector of Nigeria. The decline in agricultural production has brought terrible consequences which include decline in employment rate and other problems such as food crisis, inflation, corruption and poor attitude to work. The emergence of crude oil and the 'easy money' from petroleum led to the abandonment of agriculture, (Manggoel *et al.,* 2012; Udah & Odey, 2016).

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At the community level, rural-urban drift also led to the abandonment of agriculture and this drift depleted the hands needed to continue with agriculture as it became increasingly less fashionable. The immediate impact of all these is that people became structurally dislocated from their occupations in the communities in which they had more skills into the cities where they were forced to look or engage in jobs were they had less skills to perform. With this, agricultural production suffered and Nigeria gradually became a food importer which finally led with the passage of time to her becoming dependent on the rest of the globe for food imports. As agriculture suffered, the population increased, as the skill demand level for other jobs increased over time and as lifestyle changed, more and more people found themselves increasingly in the unemployment queue. These sets of people as a result of certain factors were unable to go back to Agriculture and this reduced the employment situation in the economy.

Agricultural sector as one of the major real sectors of the economy ought to be one of the basic drivers of employment creation in every society but that has not been the case in Nigeria as a consequence of distorted national policies. As Agricultural development dwindled, the nation's employment situation worsened showing that there is a strong correlation between these sectors.

Again, the knowledge of Nigeria agricultural production setting as observed by Okuneye (2002), has shown that the small-scale farmers dominate agricultural production in the magnitude of about 85 percent of total production. These small-scale farmers are characterized by high dependence on agricultural labour market, with little or no forms of savings or storage facilities, unfavourable cultural practices and high cost of labour. The socio economic and production characteristics of the farmers, inconsistent and unfocused government policies as well as inadequate infrastructural base (road networking/bad transportation system), all combined to choke the sector. This results in low production, and consequently high prices of food items. This invariably affects the level of employment in Nigeria in the short and long run.

Another cause of decline in agricultural production in Nigeria is the widening technology gap in agriculture itself which results in low labour productivity. Apart from these, other factors include: problems connected with high demand for imported goods which affect the demand for domestic goods (Nwafor, Odey & Effiong, 2017). According to World Bank (2014) report, some of the major constraints of agricultural sector in Nigeria are the low rates of input used, especially fertilizers which are usually of poor quality as a result of frequent adulteration. The low rate of input use is traced to high costs of transportation, poor distribution channels, absence of private sector

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participation, great risk in importation and lack of consistent government policies on the sector. Lack of access to inputs and degradation coupled with low level of investment in agricultural research have been outlined as constraints to the agricultural sector development which has led to a decline in employment in the agricultural sector and other sectors in the economy. The employment rate in the economy stood at 78.9 percent in 2010 but it declined to 76.1 per cent in 2011. There were further declines in rates of employment in the country to 72.6 and 72.2 percents in 2019 and 2022 respectively (NBS, 2023).

Moreso, empirical studies on the impact of agricultural sector development on employment showed mixed results. While some studies established a positive relationship between agricultural sector development and employment, some other studies found a negative impact of agricultural sector development on employment. For instance, studies such as Ogalubi & Wokocha (2013), Oni (2013), Nlerum & Owen (2015) for Nigeria have found positive and significant relationships between agricultural sector development and employment. On the other hand, studies such as South Africa Department of Agriculture, Forestry and Fisheries, SDAFF (2010) for South Africa, and Chidoko & Zhou (2012) for Zimbabwe have established that there is a negative relationship between agricultural sector development and employment. The mixed results from previous studies make it difficult to make a general conclusion about the impact of agricultural sector development on employment. Therefore, the basic statement of problem of this study is whether agriculture sector development has help in promoting employment in Nigeria. It is against these backgrounds, that these questions arise: what is the causal relationship between agricultural sector development and employment in Nigeria? And what is the impact of agricultural sector development on employment in Nigeria?

Hence, the main objective of this study was to examine the impact of agricultural sector development on employment in Nigeria. The specific objectives are to investigate: The causal relationship between agricultural sector development and employment in Nigeria, and the impact of agricultural sector development on employment in Nigeria.

REVIEW OF RELATED LITERATURE

Empirical Studies
Nlerum and Owen (2015) investigated the impact of livestock farming on employment generation in Etche Local Government Area of Rivers State, Nigeria. Methods of data analyses used for the study were frequency, percentage, and analysis of variance. Findings from the study indicated that the average age of livestock farmers was 35.5 years indicating they are young and active, meaning that livestock farming can be used

to provide employment for unemployed youths in the area. Poultry farming was more (65%) than other stocks, meaning that investment in poultry farming will provide more employment than other livestock sectors. The study concluded that livestock farming is useful in employment generation in the study area. For livestock farming to generate more employment in the area, development agencies should provide enough and affordable livestock drugs and vaccines and market for the sale of livestock outputs in the area.

Ogbeide *et al.* (2015) argued that one of the reasons why agricultural employment intervention strategy is not successful is that resources are directed towards too many people that lack interest in agriculture and are not resilient enough for rural living where almost all agricultural endeavours are carried out.

Nwanyanwu *et al.* (2014) assessed the impact of National Programme for Food Security (NPFS) on self-employment in rural areas of Rivers State. Multi-stage proportionate stratified random sampling and cluster sampling techniques were adopted to obtain 90 and 30 samples from participating and non-participating farmers respectively. A well-structured questionnaire, in-depth interview and direct field observations were employed to elicit responses on socio-economic characteristics and other relevant variables from 120 subjects. Descriptive statistics of frequency count, percentages and mean were used to present the socio-demographic variables and answer the research questions. Z-statistics was used to test the hypotheses at 0.05 per cent level of significance. The results revealed that non-participating farmers were more self-reliant than participating farmers; therefore, government NPFS programme did not impact significantly on self-employment. Low participation of farmers was responsible for the failure of NPFS programme. The study recommended constant review of agricultural programmes, reformed input supply system and periodic training and retraining of farmers.

Olulu and Kalu (2013) used indicators such as rural employment, livestock and food crop production and increase in rural income generation to determine the gains of agricultural employment intervention. They argued that the selected indicators did not show improvement in the living standard of the rural communities and that the agricultural programs for creating employment have not created real employment nor reduce poverty.

Oni (2013) analyzed the capacity of cassava value chain to create new jobs and generate increased income and employment in the economy of Nigeria. Framework of analysis of collected primary data was based on the concept of value chain. Descriptive statistics

such as frequency distribution, percentages and measures of central tendency were employed in the analysis and presentation of results. Results showed that in the cassava value chain, increased income and employment can be generated through development of the chain especially at the stages of production, processing and industrial utilization. The implication is that increased generation of employment which is required for growth lies with increased industrial processing and utilization of cassava for expanded production of non-food and non-traditional industrial products of cassava that are competitive to penetrate export markets. In this way, opportunities to generate increased income and employment will be enormous and diversified. Policy recommendations towards development of the cassava chain included efficient investment in infrastructure in the rural sector.

Manggoel *et al.* (2012) found that increased agricultural outputs enhances food security and employment opportunities. More so, it will encourage the setting up of agro-industries in the most economically depressed areas of Nigeria, and providing training grounds for agricultural entrepreneurs which in the long run will lead to increase in employment and income, reduction in poverty among the country's labour force and the overall economic growth of Nigeria.

Ogbanga (2018) examined the relationship between agricultural development and employment generation in Nigeria from 2008 to 2017.The model was estimated using error correction mechanism and granger causality test, and it was found that agricultural sector growth and other explanatory variables contributed significantly to employment generation in Nigeria.

Ayomitunde *et al.* (2020) investigated the role of agriculture in generating employment in post SAP era in Nigeria. The cointegration, DOLS and Granger causality approach was used to estimate the model. It was revealed from the findings that agricultural sector contributed to employment generation in the country, though not significant in the post SAP era. However, the contribution of agricultural expenditure to the employment generation was negative, and a one-way feedback flows from employment to agricultural expenditure and expenditure on agriculture granger causes inflation rate in the economy.

Owan *et al.* (2024) investigated the nexus between manufacturing output and employment in Nigeria, using the Autoregressive Distributive Lag (ARDL) estimation technique. It was revealed from the findings that there is a long run relationship exist among the variables. It was revealed that long run relationship exists among the variables in the estimated model. The results of the Error Correction Mechanism (ECM) within the

framework of the ARDL shows that the development of the manufacturing sector is one of the key strategies for the creation of employment opportunities in Nigeria.

Dikeogu-Okoroigwe *et al.* (2024) examined the effect of agricultural sector productivity on employment generation in Nigeria from 1981 to 2021. The study adopts descriptive statistics, unit root test, co-integration and Error Correction Modeling techniques for the analysis. The study used ratio of employment to total population to proxy employment generation whereas agricultural productivity was disaggregated into crop production, livestock, forestry and fishing. The results of analysis indicated that a long run relationship exists among the variables based on the co-integration test. Furthermore, the paper revealed that crop production, livestock, fishing and deposit money banks' credit to agriculture does not generate employment in Nigeria while forestry generate employment in Nigeria. The paper therefore concludes that agricultural productivity does not generate employment in Nigeria within the period under review.

Theoretical underpinnings

This study is anchored on the conservation model and the Keynesian theory of employment. The conservation model was developed during the agricultural revolution of the 18[th]century in England and was supported by English Economists such as Malthus, David Ricardo and J.S. Mill. The model assumed that since the land for agricultural production is scarce therefore soil exhaustion is possible and actions to prevent reduction in yields or to increase land productivity will have only slow effect. Furthermore, it states that scarcity of land leads to usage of infertile land which cause decline in the marginal productivity of labour and land. Thus, to prevent these declines, maintaining soil productivity should be a top priority and crop-livestock husbandry should be encouraged since livestock will provide for the crops. The weaknesses of the model are that it does not consider inputs from the industrial sector such as chemical fertilizers; It refused to recognized past and present effect of change in technology on the demand for land in agriculture and the model generally measures land and productivity only in physical units. However, the strength of the model is based on the fact that agricultural development within the conservative model framework has been a success in China between l950s and 1960s where there was sustained growth rate of 1.0 percent per year in agricultural production.

The Keynesian theory of employment on the other hand was propounded by John Maynard Keynes in 1936. The Keynesians explained the determination of national output and employment in terms of the level of aggregate demand in relation to and economy's potential output- (what it could produce where resources are fully and

efficiently utilized, given the prevailing technology). The thrust of the Keynesian theory and its unique difference from the classical stand point was the contention that nothing inherent in a market economy would guarantee that the actual level of national income would be exactly equal to potential full employment; everything depends on the level of aggregate demand. Keynesian's advocation for unemployment eradication; increase total demand through direct increases in government expenditure or by government policies that indirectly encourage more private investment (low interest on business loan, tax allowance and holidays, investment subsidies). The Keynesian theory is limited in its applicability to the Nigerian economic situation because it is based on the institutional and structural assumption of a well-functioning product, factor, money market that characterize the developed countries economies. (Jhingan, 1997).

METHODOLOGY

Research Design
This study employed a quasi-experimental research design which is used to examine how independent variables affect dependent variable. This approach is used here in the analysis of the impact of agricultural sector development on employment in Nigeria. The adopted design is such that enabled the description of the phenomenon and establish a functional relationship between the dependent and independent variables. The quantitative nature of research requires an empirical analysis aimed at testing the hypothesis stated in order to determine the cause and effects among the variables adopted.

Model specification
The model for this study is specified as follows:

$EMPT = f(AGSDEV, TGEXAG, PRINV, INFLA)$ 3.1

The econometric form is specified as:

$EMPT_t = a_0 + a_1 AGSDEV_t + a_2 TGEXAG_t + a_3 PRINV_t + a_4 INFLA_t + U_t$ 3.2

While the log form of the model was specified as:

$LogEMPT_t = a_0 + a_1 logAGSDEV_t + a_2 logTGEXAG_t + a_3 logPRINV_t + a_4 INFLA_{tt} + U_t$ 3.3

Where:

EMPT = Employment rate (EMPT) at time t measured in percentage (1- unemployment rate). AGSDEV = Agricultural sector development (AGSDEV) at time t captured by the outputs of the agricultural sector and measured in millions of naira or (GDP minus other sectors' output). TGEXAG = Total government expenditures on agriculture (TGEXAG) at time t measured in millions of naira. PRINV = Private investments (INV) at time t measured in millions of naira. INFLA = Inflation rate (INFL) at time t measured in percentage. Ut = Stochastic error term at time t. a_0 = constant term. a_1-a_4= Coefficients of the various explanatory variables.

ANALYSIS AND DISCUSSIONS OF FINDINGS

Descriptive Analysis of Data

The descriptive statistics of the data employed in this research are shown in table 4.1. In descriptive statistics, normality tests are used to determine whether a data set is normally distributed. Generally, a low JB (Jarque Bera) value and high p-value are indicative of normality. Therefore, the result below in the order of normality shows that all the variables in the model except agricultural sector development (AGSDEV) are normally distributed compared to the probabilities of JB which is less than 5 percent significance level. Only the probability of AGSDEV which is 0.777786 is greater than 5 per cent significance level.

The result shows that private investment (PRINV), total government on agriculture (TGEXAG), and inflation rate (INFLA) are normally distributed with JB values of 54.90519, 36.76340 and 23.58015 respectively and p-values of 0.000000, 0.000000 and 0.000008 respectively. The average level of Employment (EMPT) which is the dependent variable is 19807699 with standard deviation of 7012797. On the average AGSDEV, PRINV, TGEXAG and INFLA are 0.339023, 925143.2,13973.59 and 19.36295 respectively with standard deviation of 0.072133, 1917024, 23446.93 and 16.99279 respectively. EMPT, AGSDEV, PRINV, TGEXAG and INFLA are positively skewed

Table 4.1 Descriptive Statistics

	EMPT	AGSDEV	PRINV	TGEXAG	INFLA
Mean	19807699	0.339023	925143.2	13973.59	19.36295
Median	18337566	0.339500	41522.60	1471.850	12.79500
Maximum	33716509	0.488000	6728493.	85600.70	72.81000
Minimum	9582264.	0.202000	1233.400	1.920000	3.200000
Std. Dev.	7012797.	0.072133	1917024.	23446.93	16.99279
Skewness	0.426357	0.024627	2.197771	1.871294	1.607874
Kurtosis	2.041104	2.478729	6.259983	5.458821	4.587723
Jarque-Bera	3.018774	0.502608	54.90519	36.76340	23.58015
Probability	0.221045	0.777786	0.000000	0.000000	0.000008
Sum	8.72E+08	14.91700	40706300	614837.8	851.9700
Sum Sq. Dev.	2.11E+15	0.223739	1.58E+14	2.36E+10	12416.46
Observations	52	52	52	52	52

Source: Author's computation, 2024.

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Correlation analysis

Table 4.2 shows the result of the correlation analysis. It is revealed that agricultural sector development (AGSDEV), private investment (PRINV) and total government expenditures on agriculture (TGEXAG) relate positively with employment. Only inflation rate has an inverse relationship with employment.

Table 4.2 Correlation of the Variables

	EMPT	AGSDEV	PRINV	TGEXAG	INFLA
EMPT	1.000000	0.096114	0.775848	0.770559	-0.149428
AGSDEV	0.096114	1.000000	0.036774	0.009185	-0.020981
PRINV	0.775848	0.036774	1.000000	0.715047	-0.241046
TGEXAG	0.770559	0.009185	0.715047	1.000000	-0.220610
INFLA	-0.149428	-0.020981	-0.241046	-0.220610	1.000000

Source: Author's computation, 2024

Data Analysis

Augmented Dickey-Fuller Unit Root Test Results

Using the augmented Dickey-Fuller unit root test for stationarity, the results as presented in Table 4.3 reveals that investment (PRINV), total expenditures on agriculture (TGEXAG) , inflation (INFLA) , Employment (EMPT) and Agricultural Sector Development (AGSDEV) were stationary at first difference because their calculated values of (-9.245798, -7.684542 ,-6.683355,-4.069040 and -5.165553) at first difference are greater than the critical values (-2.931404,-2.941145, -2.933158,-2.931404 and -2.933158)   at 5 % level, meaning they are integrated of order one ,i.e. I(1)

Table 4.3 Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	ADF statistics (Computed) 5% Level		5% Critical Value		
	Level	1st Diff.	Level	1st Diff.	Remark
AGEMP	-2.8963	-4.0690*	-2.9297	-2.9314	I(1)
AGSDEV	-2.4730	-5.1655*	-2.9297	-2.9331	I (1)
PRINV	-0.2503	-9.2457*	-2.9314	-2.9314	I (1)
TGEXAG	-1.8892	-7.6845*	-2.9411	-2.9411	I (1)
INFLA	-2.4606	-6.6834*	-2.9297	-2.9332	I (1)

Source: Computed by the Author, 2024.
* Depicts stationarity at 5%

Phillips- Perron Unit Root Test Results
In the same vein, using the Phillip-Peron unit root test as illustrated in table 4.4, it is indicated that employment (EMPT), investment (PRINV) ,total government expenditures on agriculture (TGEXAG), agricultural sector development (AGSDEV) and inflation rate (INFL) were stationary at first difference because their calculated values of (-3.9818748, -10.24273 ,-8.408087, -6.108651 and -11.33283) at first difference are greater than the critical values (-2.931404,-2.931404,-2.936942, -2.931404 and -2.931404)   at 5 % level, meaning they are integrated of order one ,i.e. I(1) .Thus, a co-integration test was carried out to confirm and determine the existence of a long-run relationship among the variables related to employment (EMPT).

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Table 4.4 Phillip-Perron (PP) Unit Root Test Results

Variables	PP Statistics (Computed) 5% Level		5% Critical Value		
	Level	1st Diff.	Level	1st Diff.	Remark
EMPT	-2.4072	-3.9819*	-2.9297	-2.9314	I(1)
AGSDEV	-2.3730	-6.1087*	-2.9297	-2.9314	I (1)
PRINV	-0.2061	-10.2427*	-2.9297	-2.9314	I (1)
TGEXAG	-1.9304	-8.4081*	-2.9332	-2.9369	I (1)
INFLA	-2.3652	-11.333*	-2.9297	-2.9314	I (1)

Source: Computed by the Author, 2024.
* Depicts stationarity at 5%

Cointegration Test Results

The Johansen Co-integration test results reveal that there is a long run relationship between employment (EMPT) and the independent variables captured in the model. The result of the trace test indicates three c- integrating equations at 5 %. This is largely because the trace statistic values of 106.6326,58.54764 and 29.98637 are all greater than the critical values of 69.81889,47.85613 and 29.79707 respectively at 5 % level. We therefore reject the null hypothesis of none*, At most 1* and at most 2*of the hypothesized number of co-integrating equation.

More so Max- Eigen statistic indicates two co-integrating equation at 5 per cent level of significance. This is because the Max-Eigen statistic values of 48.08500 and 28.56127 are greater than the critical values of 33.87687 and 27.58434. Hence, the conclusion is that there exists a long-run relationship amongst the variables in our model. Therefore, the variables are qualified to be used for error correction modeling. These are shown in table 4.5 and table 4.6 respectively.

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Table 4.5 Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	5 Percent Critical Value	Prob**
None *	0.717872	106.6326	69.81889	0.0000
At most 1*	0.528394	58.54764	47.85613	0.0036
At most 2*	0.426203	29.98637	29.79707	0.0475
At most 3	0.164860	8.878146	15.49471	0.3768
At most 4	0.052075	2.032235	3.841466	0.1540

Trace test indicates 3 cointegrating equation(s) at the 0.05 level

* Denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's Computation (2024)

Table 4.6 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	Prob**
None *	0.717872	48.08500	33.87687	0.0006
At most 1*	0.528394	28.56127	27.58434	0.0374
At most 2	0.426203	21.10822	21.13162	0.0504
At most 3	0.164860	6.845911	14.26460	0.5075
At most 4	0.052075	2.032235	3.841466	0.1540

Max-eigenvalue test indicates 2 cointegrating equation(s) at the 0.05 level
* Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Source: Author's Computation (2024).

Granger Causality Test Results

According to the result presented in table 4.7, the F-statistic values of 2.11211 and 0.58218 show that there is one way-causality amongst the variables in the granger causality equation. This implies that the causality runs from employment to agricultural sector development. This means that it is Employment that granger cause agricultural sector development in Nigeria.

Table 4.7 Granger Causality Test

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(EMPT) does not Granger Cause D(AGSDEV)	44	2.11211	0.1346
D(AGSDEV) does not Granger Cause D(EMPT)		0.58218	0.5635

Source: Author's Computation, 2024.

Optimal lag length selection

To estimate the ECM and ensure that the parameters are consistent, it is important that the optimal lag length is utilized in the estimation procedure. We select the lag length of 3 following the results from the lag order selection criteria: Likelihood Ratio (LR); Final Prediction Error (FPE); Akaike Information Criterion (AIC); Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQ). As Table 4.8 shows Akaike criterion, select lag order two.

Table 4.8 VAR lag order selection test VAR (1) to VAR (3)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-112.7957	NA	0.000339	6.199776	6.415248	6.276439
1	67.53256	303.7108	9.67e-08	-1.975398	-0.682567*	-1.515418*
2	79.77645	17.39922	2.03e-07	-1.304024*	1.066167	-0.460728
3	129.8318	57.95885*	6.60e-08*	-2.622728	0.824822	-1.396116

* Indicates lag order selected by the criterion

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Error Correction Model

Table 4.9 Over-parameterized Result
Dependent Variable: D(LEMPT)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.011147	0.004059	2.746488	0.0118
D(LEMPT(-1))	-0.597650	0.234889	-2.544387	0.0185
D(LEMPT(-2))	1.105880	0.260960	4.237732	0.0003
D(LAGSDEV)	0.000195	0.004661	0.041739	0.9671
D(LAGSDEV(-1))	0.009475	0.004994	1.897395	0.0710
D(LAGSDEV(-2))	0.007071	0.005399	1.309672	0.2038
D(LPRINV)	-0.001482	0.001943	-0.762794	0.4537
D(LPRINV(-1))	0.001716	0.002067	0.830303	0.4153
D(LPRINV(-2))	8.25E-05	0.001835	0.044971	0.9645
D(LTGEXAG)	-0.000827	0.001390	-0.594972	0.5579
D(LTGEXAG(-1))	0.003488	0.001342	2.598941	0.0164
D(LTGEXAG(-2))	0.003904	0.001266	3.083463	0.0054
D(INFLA)	0.000155	0.001088	0.142888	0.8877
D(INFLA(-1))	0.000256	0.000909	0.281320	0.7811
D(INFLA(-2))	-0.000729	0.001054	-0.691180	0.4967
ECM1(-1)	-0.576874	0.283621	-2.033961	0.0542

R-squared	0.784295			
Adjusted R-squared	0.637223			
F-statistic	5.332738	Durbin-Watson stat		1.94368
Prob(F-statistic)	0.000227			

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Source: Author's computation (2024), using E-Views 9.

Table 4.10 PARSIMONIOUS RESULTS

Dependent Variable: D(LEMPT)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.010729	0.003409	3.147144	0.0036
D(LEMPT(-1))	-0.080146	0.126363	-0.634248	0.5304
D(LEMPT(-2))	0.592646	0.122382	4.842602	0.0000
D(LAGSDEV(-1))	0.010807	0.004305	2.510093	0.0173
D(LTGEXAG(-1))	0.004097	0.000967	4.239002	0.0002
D(LTGEXAG(-2))	0.004014	0.000995	4.034785	0.0003
ECM1(-1)	-0.340943	0.170122	-2.004109	0.0536

R-squared	0.685878			
Adjusted R-squared	0.626980			
F-statistic	11.64522	Durbin-Watson stat		2.189366
Prob(F-statistic)	0.000001			

Source: Author's computation (2024), using E-Views 9.

Table 4.10 above presents the parsimonious results of the error correction model using time series data. First, the study found that the constant (intercept) term has a positive sign. This implies that even in the absence of all other explanatory variables, Nigeria's employment will still increase. From the result, an increase of 1 percent in one year lag value of employment will lead to 0.08 percent decrease in employment (EMPT). One year lag value of employment (EMPT) is statistically insignificant at 5 percent level. This is because its p-value of 0.5304 is more than 0.05. By this, it means that one year

lag value of employment (EMPT) has a negative and insignificant relationship with employment (EMPT).

Similarly, an increase of 1 percent in two-year lag value of employment will lead to 0.59 percent increase in employment (EMPT). Two-year lag value of employment (EMPT) is statistically significant at 5 per cent level. This is because its p-value of 0.000 is less than 0.05. By this, it means that two-year lag value of employment (EMPT) has a positive and significant relationship with employment (EMPT). From the result, a 1 percent increase in one year lag value of agricultural sector development (AGSDEV) will increase employment by 0.01 percent. One year lag value of agricultural sector development (AGSDEV) is statistically significant at 5 percent level because its p-value of 0.0173 is less than 0.05. This means that agricultural sector development (AGSDEV) has a positive and significant relationship with employment in Nigeria.

Also from the result, a 1 percent increase in one year lag value of total government expenditures on agriculture (TGEXAG) will lead to 0.004 percent increase in employment (EMPT). One year lag value of total government expenditures on agriculture (TGEXAG) is statistically significant at 5 percent since its p-value of 0.002 is less than 0.05. This depicts a positive and significant relationship between one year value of total government expenditure on agriculture (TGEXAG) and employment (EMPT). Moreso, from the result a 1 percent increase in two-year lag value of total government expenditures on agriculture (TGEXAG) will lead to 0.004 percent increase in employment (EMPT). Two-year lag value of total government expenditures on agriculture (TGEXAG) is statistically significant at 5 percent because its p-value of 0.003 is less than 0.05. This shows a positive and significant relationship between two-year value of total government expenditure on agriculture (TGEXAG) and employment (EMPT) in Nigeria.

Accordingly, the coefficient of the error correction model (ECM) is negative (-0.340943) and statistically significant. The ECM result reveals a slow speed of adjustment of about 34.09 percent from the short to the long run. More so, the statistically significant of the ECM at 5 percent level of significance shows that there is a long run relationship between employment (EMPT) and the independent variables in the study.

The adjusted R-Squared indicates that our model explains about 62.69 percent of the total variation in employment (EMPT). The remaining 37.31 percent left unexplained is attributed to other variables not captured in the model, but represented by the error term. Hence, the model has a good fit. The F-statistic is statistically significant at 5 percent

level of significance. This is because the F-statistic calculated value of 11.65 is greater than the F-statistic tabulated value of 2.45. We therefore conclude that the overall estimated model is statistically significant.

From the result, the Durbin-Watson statistic value of 2.19 falls under the no auto-correlation. Thus, the residuals are uncorrelated and the findings of the study can be used for policy formulation.

DISCUSSION OF FINDINGS

The findings from the granger causality result revealed that there is one way causality amongst the variables in the granger causality equation. This implies that causality runs from employment to agricultural sector development in Nigeria under the study period. This outcome may be that increases in employment opportunities raises the income of the people and this in turn increases savings, hence investment in the agricultural sector. From economic theory, investment in the agricultural sector will tend to increase the output of the agricultural sector in Nigeria to a large extent.

From the results, a 1 percent increase in one year lag value of agricultural sector development (AGSDEV) will increase employment by 0.01 percent. One year lag value of agricultural sector development (AGSDEV) was statistically significant at 5 percent level because its p-value of 0.0173 is less than 0.05. This means that agricultural sector development has a positive and significant relationship with employment in Nigeria.This finding conforms to *a priori* expectation. This indicates that the various agricultural programmes and policies of various administrations in the country have been yielding fruits and have contributed to the growth and expansion of the country's agricultural sector leading to increase in employment in the country. Broadly speaking, this finding is in line with that of Ogbalubi & Wokocha (2013), Oni (2013) as well as Owan *et al.* (2024) whose findings indicated that development in the country's agricultural sector has a positive relation with employment. However, the finding disagrees with that of SDAFF (2010) for South Africa and Chidoko & Zhou (2012) for Zimbabwe whose studies showed a negative relation between agricultural sector development and employment.

Also from the results, one- and two-year lag values of total government expenditures on agriculture have significant and positive relationships with employment. This outcome depicts that the huge expenditures in the country agricultural sector by different administrations has gone a long way in transforming the country's agricultural sector thus providing linkages to other sectors of the economy such as industrial sector leading to the creation of employment opportunities in the country. This outcome is consistent

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with the Keynesian theory of employment which advocate for direct increases in government expenditures as a means of increasing employment.

CONCLUSION AND POLICY RECOMMENDATIONS

This study examined agricultural sector development and employment in Nigeria for the period 1970 to 2022. It is concluded from the findings that employment is the cause of agricultural sector development in Nigeria under the study period and agricultural sector development has a positive and significant impact on employment in Nigeria. The implication of this is that the different agricultural policies and programmes in the country has gone a long way in transforming the country's agricultural sector thus providing linkages to other sectors of the economy such as industrial sector leading to the creation of employment opportunities in various sectors of the economy and employment in turns raises the income of the people and this stimulates increases in savings, hence investment in the agricultural sector increases the output of the agricultural sector in the economy. Hence, the positive effect of one year lag value of agricultural sector development calls for more public-private partnership in the agricultural sector so that the sector can be developed rapidly through the supply of inputs, finance, infrastructures, market access among others to provide the linkages to the industrial sector so as to create the required employment in agricultural, industrial and other sectors of the economy. The positive effect of one year and two-year lag total government expenditures on agriculture calls for more funds to be injected into the agricultural sector to modernize the sector so that the sector can be made attractive to unemployed graduates to go into small and medium scale enterprises which is regarded as a veritable source of employment generation globally. The one-way causality running from employment to agricultural sector development demands that the federal government in collaboration with the National Directorate of Employment should create more jobs to the unemployed graduates in the country so as to assist in increasing the income of the youths who will have excess money to invest in the agricultural sector in order to help boost agricultural sector productivity in the country. Government should ban food import, backed by right policies to encourage local food production and processing of our local agricultural products.

REFERENCES

Awokuse, T. (2008). Does agriculture really matter for economic growth in developing countries? American Agricultural Economics Association Annual Meeting. Milwaukee, WI.

Publication of the European Centre for Research Training and Development -UK

Ayomitunde, A. T., Pereowei, A. B., Abosede, A. A., & Eusebius, A. C. (2020). Agricultural sector and employment generation in post sap era Nigeria: an empirical perspective. *International Journal of New Economics and Social Sciences,* 1(11), 185-196.

Central Bank of Nigeria (2023). Statistical Bulletin.

Chidoko, C., & Zhou, S. (2012). Impact of agricultural development on youth employment in Zimbabwe: The case of Masvingo province. *Russian Journal of Agricultural and Socio-Economic Sciences*, 11(11), 24-27.

Dickey, D. A. & Fuller, W.A. (1979). Distributions of the estimators for autoregressive time series with a unit root. *Journal of American Statistical Association,* 74(366): 427-431.

Dikeogu-Okoroigwe, C. C. F., Okonkwo, O. N. & Ifeanyichukwu, A. L. (2024). Agricultural sector productivity and employment generation in Nigeria. *Imo State University /Business & Finance Journal*, 14(4), 126-141.

Falola, T., & Haton, M. (2008). A history of Nigeria. Cambridge University Press. 183.

Fasoranti, O. O. (2006). Impact of agricultural development programmes (ADPs) on the quality of social existence of rural dwellers in developing economies: The Ondo State Agricultural Development Programme Experience: *International Journal of Rural Management, 2(2)*, 213-226.

Jhinghan, M. L. (1997). The economics of development and Planning. 40th edition. Vrinda Publications Ltd.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics,* 52(2): 169-210.

Manggoel, W., Ajiji, L., Damar, W. K., Damiyal, D. M., Daar, J. W., & Zarnai, D. U. (2012). Agriculture as a mitigating factor to unemployment in Nigeria. *International Research Journal of Agricultural Science and Soil Science, 2(11)*, 465-468.

National Bureau of statistics (NBS) publications (2023).

Nlerum, F. E., & Owen, O.J. (2015). Livestock farming for employment generation in Etche Local Government Area of Rivers State, Nigeria. *Asian Journal of Agricultural Extension, Economics &Sociology*, *7(2),* 1-8.

Nwafor, J. U., Odey, F. I. & Effiong, C. E. (2017). Financial liberalization and domestic savings in Nigeria: An empirical analysis. *International Journal of Development and Economic Sustainability*, 5(6), 84-97.

Nwanyanwu, D.H., Chukwuemeka, A., & Amadi, N. (2014). Assessment of farm outputs and rural income generation of school-to-land agricultural programme (STLAP) in Rivers State, Nigeria. *Journal of Biology, Agriculture and Healthcare*, 4*(14)*, 126-134.

Ogbalubi, L.N., & Wokocha, C.C. (2013). Agricultural development and employment generation: The Nigerian experience. *Journal of Agriculture and Veterinary Science, 2(2),* 60-69.

Ogbanga, A. (2018). Agricultural development and employment generation in Nigeria. *International Journal of Advanced Studies in Ecology, Development and Sustainability*, 5(1), 1-22.

Ogbeide, O.A., Ele, I. & Ikheloa, E. (2015). Young people and agricultural employment: Locality and interest factors. *Mayfair Journal of Agriculture Development in Emerging Economies, 1(1)*, 1-13.

Okuneye, P. A. (2002). Rising cost of food prices and food insecurities in Nigeria and its implication for poverty reduction. *CBN Economic and Financial Review, (39)4.*

Olulu, R.M., & Kalu, I.E. (2013). Impact of government school-to-land agricultural project on rural development in Rivers State, Nigeria. *Journal of Economics and Sustainable Development 4(12)*, 39-45.

Oni, T. O. (2013). Evaluation of income and employment generation from cassava Value chain in the Nigerian agricultural sector. *Asian Journal of Agriculture and Rural Development, 3(3)*, 79-92.

Owan, J. O., Ifere, E. O. & Odey. F. I. (2024) The impact of manufacturing output on employment in Nigeria, *International Journal of Developing and Emerging Economies*, 12(2), 1-23.

South Africa Department of Agriculture, Forestry and Fisheries, SDAFF, (2010). Estimate of the contribution of the agriculture sector to employment in the South African economy, 1-35.

Udah, E. B. & Odey, F. I. (2016). Real exchange rate misalignment and economic performance in Nigeria. *Global Journal of Social Sciences*, 15, 13-25.

World Bank (2014). World development report. Agriculture for development. World Bank.