Agricultural Sector Output and Economic Growth in Nigeria

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Abstract

The study empirically investigated the effect of agricultural sector output on economic growth in Nigeria over a period of thirty-eight years (i.e. from 1985 to 2022). Crop production, fishing production, livestock production and forestry production were used as the proxies of agricultural sector output while Gross Domestic Product was used as the proxy of economic growth. The study made use of annual times data which were sourced mainly from Central Bank of Nigeria (CBN) statistical bulletin. The techniques of data analysis adopted were Augmented Dickey-Fuller (ADF) statistic and Ordinary Least Square (OLS) regression technique. The findings of the study showed that crop production has a positive and significant effect on Gross Domestic Product in Nigeria, fishing production has a positive and significant effect on Gross Domestic Product in Nigeria, livestock production has an insignificant positive effect on Gross Domestic Product in Nigeria while forestry production has a positive and significant effect on Gross Domestic Product in Nigeria. Based on the findings, the study concluded that agricultural sector output has a significant effect on economic growth in Nigeria. The study recommended among others that government should encourage agricultural research and development as well as providing modern research facilities which would help improve the quality of agricultural output in the country.

Key Words: *Agricultural Sector Output, Economic Growth, Gross Domestic Product*

1. INTRODUCTION

Without gainsaying, agriculture throughout history has served as an integral part of man's primary survival with the basic provision of food for man's consumption. Over the years, agriculture has been an important sector in the Nigerian economy irrespective of oil boom. In a more definitive sense, agriculture entails more than just the provision of food for man; it has also served man in a more economic aspect of life. Thus, agriculture can be defined as the growing of food and cash crops as well as the rearing of animals for both immediate consumption as well as economic purposes. There are a number of economic activities that are linked with agricultural processes which are carried out with the sole purpose of making profit. These activities may include some of the following; livestock and forestry, fishery, processing and finally the marketing of such agricultural produce (Babatunde, Biodun, Ibukun & Bode, 2017). Basically, the agricultural sector provides employment opportunities for the teeming population, eradicates poverty and contributes to the growth of the economy. In Nigeria also, because 70% of the population is employed in the agriculture sector, economic growth will be almost impossible to achieve without developing the sector. Furthermore, the importance of agriculture to the Nigerian economy is evident in the nation's natural endowments in production sectors – extensive arable land, water, human resources, and capital. Exploring the nation's productive advantage in this sector is the fastest way to stimulate growth in the economy (Idoko & Jatto, 2018). Furthermore, the important benefits of the agricultural sector to Nigerian economy include: the provision of food, contribution to the Gross Domestic Product (GDP), provision of employment, the provision of raw materials for agro-allied industries, generation of foreign earnings labour and improvement of entrepreneurship through capacity building. The realization of this fact led Nigerian government to embark on several agricultural development programmes in order to develop agricultural sector (Ogbonna & Osondu, 2015). It follows that agriculture financing is one of the most important instruments of economic policy for Nigeria, in her effort to stimulate development in all directions. Finance is required by agricultural sector for the purchase of land, construction of buildings, acquisition of machinery and equipment, hiring of labour and irrigation facilities. In certain cases, such finance may also be needed to purchase new and appropriate technologies. Not only can finance remove financial constraints, but it may also accelerate the adoption of new technologies which will lead to improvement of agricultural output and consequently economic growth (Obansa & Maduekwe, 2013).

However, the Federal Government of Nigeria in the past had initiated various agricultural credit related policies and programmes in attempt to enhance economic growth and improve agricultural production through provision of cheap financial resources to farmers at a concessionary interest rate. Agricultural Credit Guarantee Scheme Fund (ACGSF) is one of such schemes enunciated by the federal government of Nigeria. Other programmes and schemes include; Agricultural Credit Support Scheme (ACSS) people Bank of Nigeria (PBN), Nigeria Agricultural and cooperative Bank [NACB), Economic advancement programme (EAP), Nigerian Industrial Devotement Bank (NIDB), and National Economic Reconstruction Fund (NERFUND). The aim is to identify key macroeconomic impact on agricultural financing in Nigeria from (1980-2010) and this has led to improvement in agricultural production and hence, growth in the Nigerian economy.

According to Nwafor, Ehor Chukwu and Amuka (2019), one sector that has a critical role to play in poverty reduction in Nigeria is the agriculture sector as over 40% of the Gross Domestic Product (GDP) comes from the sector and it employs about 60% of the working population. Consequently, economic growth in Nigeria has largely been accounted for by resilient agricultural growth associated with performance in four constituent sub-sectors: crops, livestock, fisheries and forestry. Hence, agricultural sector has in recent years contributed significantly to improved growth performance in Nigeria. Empirically, Ewetan, Fakile, Urhie and Oduntan (2017) established that the agricultural sector contributed positively and consistently to the economic growth in Nigeria, reaffirming the sector's importance in the economy. Also, Oluwatoyese and Oyetadea (2021) investigated the long-run relationship between agricultural output and economic growth in Nigeria and their results approved the positive link between agricultural output and economic growth, which is helpful to improve the nation's economic outlook. Furthermore, Babatunde, Biodun, Ibukun and Bode (2017) examined the impact of agriculture output on economic growth in Nigeria and found that agricultural sector output has positive and long run impact on economic growth in Nigeria. In line with the foregoing therefore, this study seeks to contribute to the existing literature and fill the possible gap with respect to the effect of agricultural sector output on the economic growth in Nigeria.

However, Nigeria is bestowed with enormous resources for agricultural use and vast available land for crop cultivation and rearing of animals. The agricultural sector of Nigeria was well known for the exportation of agricultural products such as rubber, cocoa, groundnut, palm oil, hides and skin etc. The sector has a huge ability for economic growth and development of Nigeria. In other words, Nigeria is blessed with vast arable land for cultivation, mineral, natural and human resources and a favorable climate that supports agricultural production, but it is surprising that the potentials of agricultural sector are not optimally harnessed. Poor funding or inadequate financing has been identified as one of the principal challenges facing farmers and agro-allied entrepreneurs in Nigeria (Adeshina, Tomiwa & Eniola, 2020). In addition, agriculture which used to be the only source of food to the teeming population and the major foreign exchange earner in Nigeria as well as provision of employment before the discovery of oil, has not been performing well in recent years; its contribution to Gross Domestic Product (GDP) has been falling. The nation is now depending on other countries for food while agro-allied industries available in the country depend greatly on imported raw materials. It has been envisaged that lack of finance could be one of the major problems facing the sector. Also, in spite of the priorities accorded to agriculture by establishing special financial institutions like Nigerian agricultural and cooperative bank (NACB) and schemes like agricultural credit guarantee scheme (ACGS) and the commercial agricultural credit scheme (CACS), the sector still performs below expectation which in turn adversely affects economic growth in Nigeria.

From the previous studies conducted however, it would interest us to know that different gaps in knowledge exists and have been identified which this study aims to bridge. In terms of content, very few of the previous studies exactly adopted crop production, fishing production, livestock production and forestry production as the proxies of agricultural sector in Nigeria which are being used in this study. Methodologically, very few of previous related studies conducted pre-estimation tests and post-estimation tests in their data analyses. To the best of researcher' knowledge also, the most of the related studies previously carried out made use of data set that ended at 2020. Therefore, the point of departure here is that effort was devoted in this study to conduct a research the effect of agricultural sector output on the economic growth in Nigeria by using crop production, fishing production, livestock production and forestry production as the proxies of manufacturing sector and covering up to 2022 while both pre-estimation tests and post-estimation tests will be conducted in order to arrive at more accurate results.

Objectives of the Study

The main objective of this study is to examine the effect of agricultural sector output on the economic growth in Nigeria. Specifically, the study seeks to:

i. Investigate the effect of crop production on Gross Domestic Product in Nigeria.
ii. Determine the effect of fishing production on Gross Domestic Product in Nigeria.
iii. Analyze the effect of livestock production on Gross Domestic Product in Nigeria.
iv. Examine the effect of forestry production on Gross Domestic Product in Nigeria.

2. LITERATURE REVIEW

Theoretical Framework

For the purpose of this study, Harrod-Domar Growth Model is adopted and reviewed below:

Harrod-Domar Growth Model

There are a number of theories that try to explain the importance of agriculture to an economy. One of these theories is the Harrod-Domar Growth Model. This model was propounded by two individuals named Sir Roy Harrod (in 1939) and Evsey Domar (1946). The main idea advocated for by this growth model is that for an economy to experience economic growth, there must be high levels of savings which in turn translates into high investment and also the need to reduce capital output ratio. They advocated that the major components or requirements for economic growth include not only savings and investment but also implicit technological change or improvement. The idea that capital output ratio should reduce (i.e. less capital is required to produce a unit of output) is attainable through significant improvement in production technology. It is important to note that this model was originally developed to examine business cycles and then adopted to explain economic growth. In any event where an economy cannot achieve the previously mentioned requirement for economic growth, they can always result to borrowing from international financial institutions in order to "jump start" its economy. In order for firms to have investable funds to borrow, there is the need for higher levels of saving in the country. These firms can thus invest here funds back into the economy in order to generate economic growth through the increase in production of goods and services. If the capital output ratio decreases in an economy, it means that goods are produced with fewer input thus rendering the economy more productive. This leads to the growth of the economy. The Harrod-Domar growth model is one which is relevant in development economics. Its implications are therefore that economic growth can be achieved through improvements in technology and a reduction in the economies capital output ratio. Rate of growth (Y) = Savings (s)/ capital output ratio (k). This model implicitly describes the importance of investment of funds into capital goods as an implication of economic growth. Capital goods are goods that are used and transformed into consumer goods, so in that sense capital goods are usually what we refer to as raw materials and the one and only sector in any economy that acts as a source of these raw materials is the agricultural sector. So the implication of this is that for an economy to experience growth, the levels of savings should be high in order to create investable funds for firms to in turn invest back into capital goods and the sector which provides or produces these capital goods. But it is crucial to state that technological advancement is also important in order to reduce capital output ratio and thus achieve economic growth. In the absence of technological improvements, it is difficult for producers to reduce the cost per unit of production and as such making production more capital intensive and expensive. In a nutshell, there should be high saving habits in the economy which will promote investments in sectors such as the agricultural sector and as such gear the economy to growth. An algebraic expression of Harrod-Domar model is as follows:

i. Savings (S) is a (s) proportion of national income (Y): $S = sY$.

ii. s can be seen as the Average Propensity to Save (APS) also called savings ratio when expressed as S/Y.

iii. Investment (I) is the change in capital stocks (ΔK): $I = \Delta K$.

iv. Let k represents capital-output ratio: $k = K/Y$.

v. In the original Harrod-Domar Model, both Average Propensity to Save (s) and capital-output ratio (k) are held held constant, that is they are determined by the structural of the economy which does not change in the short run. Thus, we will also assume that both s and k are constant.

vi. If k is constant then $\Delta K/\Delta Y$ is also constant, and more precisely $k = \Delta K/\Delta Y$.

vii. Thus, $I = \Delta K$ becomes $I = k\ \Delta Y$. And for simplicity sake, let us assume that it is a close economy and when equilibrium level of national income is achieved: $S = I$

viii. $sY = k\ \Delta Y$. (By replacing I with $k\ \Delta Y$)

ix. $s/k = \Delta Y/\ Y$ (rearranging from above) or

x. $\Delta Y/Y = s/k$ xi that is the rate of economic (national income) growth is the savings ratio (S/Y) over capital-output ratio (K/Y).

Although the Harrod-Domar model advocated for an improvement in the agricultural sector since it is the source of capital goods, it still had some gaps in its theory which are to be highlighted as follows. The model believes that if a country requires money to jump start its economy, it should resort to borrowing from financial institutions. But in recent times it has been observed that developing countries who borrowed such funds are still experiencing the effects of debt burden. Also, there was too much emphasis on technological advancement being a product of capital output ratio reduction. There was total negation of human capital (education, creativity, skill) which could also have the ability of improving technology.

Conceptual Literature

Agricultural Sector Output

Agricultural sector output refers to the total value or quantity of goods and services produced within the agricultural industry during a given period. It serves as a key measure to assess the economic performance and contribution of the agricultural sector to overall economic development (Babatunde, Biodun, Ibukun & Bode, 2017). The concept of agricultural sector output encompasses a wide range of activities, including crop production, livestock farming, forestry, fishing, and related support services. It involves the production and sale of agricultural commodities such as crops, livestock, fish, timber, and other agricultural products. Additionally, it includes value-added activities such as processing, packaging, transportation, and distribution of agricultural goods (Adeshina, Tomiwa & Eniola, 2020). The measurement of agricultural sector output is crucial for several reasons. Firstly, it helps evaluate the productivity and efficiency of the agricultural sector. By assessing the total output generated, policymakers and economists can understand the sector's ability to meet domestic and international demand, as well as its potential for growth. Secondly, agricultural sector output serves as a vital component in calculating the gross domestic product (GDP) of a country. It contributes to the overall economic performance and provides insights into the relative importance of the agricultural sector compared to other sectors of the economy (Ogbonna & Osondu, 2015).

Determinants of Agricultural Sector Output

The determinants of agricultural sector output are multifaceted and involve various factors that influence the production of agricultural goods and services. Scholars in the field of agricultural economics have extensively studied these determinants to understand the dynamics of agricultural production and its relationship with economic, social, and environmental factors.

Natural Resources: The availability and quality of natural resources, including land, water, and climate conditions, play a crucial role in agricultural production. Factors such as soil fertility, rainfall patterns, temperature, and access to irrigation can significantly impact the output and productivity of agricultural activities.

Technological Advancements: The adoption of improved agricultural technologies, such as high-yielding crop varieties, mechanization, precision farming techniques, and irrigation systems, can enhance agricultural productivity and output. Technological advancements contribute to increased efficiency, reduced post-harvest losses, and improved resource management.

Inputs and Production Factors: The availability and quality of inputs, including seeds, fertilizers, pesticides, and machinery, influence agricultural sector output. Adequate access to these inputs and the efficient utilization of production factors like labor and capital are crucial determinants of agricultural productivity.

Infrastructure and Market Access: The presence of reliable transportation networks, storage facilities, market infrastructure, and access to markets are essential for agricultural sector output. Efficient logistics and market linkages facilitate the timely movement of agricultural products, reduce post-harvest losses, and enable farmers to access better prices.

Policy and Institutions: Government policies, regulations, and support programs play a significant role in shaping agricultural sector output. Policies related to land tenure, subsidies, trade, research and development, and agricultural extension services can affect productivity, investment, and innovation in the agricultural sector.

Socioeconomic Factors: Socioeconomic factors, such as population growth, income levels, urbanization, and dietary patterns, influence the demand for agricultural products. Changing consumer preferences, shifts in dietary habits, and income distribution can impact the composition and volume of agricultural sector output.

Environmental Sustainability: The sustainable management of natural resources, conservation of biodiversity, and mitigation of climate change are increasingly recognized as important determinants of agricultural sector output. Sustainable agricultural practices, including organic farming, conservation agriculture, and agroforestry, can enhance productivity while minimizing negative environmental impacts.

Economic Growth

Economic growth is an increase in the amount of goods and services produced per head of the population over a period of time (Oji-Okoro, 2011). Economic growth is the increase in the monetary value of goods and services produced in a country over a defined period of time usually a fiscal year. 38It is an increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP, usually in per capita terms. The potential contribution of agriculture to economic growth has been an on-going subject of much controversy among development economist, several authors argue that growth in the overall economy depends on the development of agricultural sector. According to Gbosi and Omoke (2014) economic growth means the expansion of a country's capacity to produce goods and services its people want within a given period. Gross Domestic Product (GDP) is mostly adopted to measure economic growth and it refers to the total market value of all final goods and services produced in an economy within a given period. Economic Growth is defined as the increasing capacity of the economy to satisfy the wants of goods and services of the members of society.

Empirical Literature

Ivongbe, Oyatayo and Atu (2022) determined the effect of agricultural sector output on the Nigerian economy. The study used econometric techniques which included; Unit Root Test, Vector Correction Model (ECM), and Autoregressive Distributed lad Model as analytical tools for the analysis of knowledge collected. The research approach utilized in the study was Ex-post Factor research design which involved dependent and explanatory variables. Secondary data were sourced from various government offices and agencies. The study showed that agricultural output (AO) makes both positive and significant impact on RGDP while Real Gross Domestic Product (RGDP), Agricultural Loans (AL) and rate of interest (INTR) made insignificant statistical impact on economic process.

Oluwatoyese and Oyetadea (2021) Investigated the long-run relationship between agricultural output and economic growth in Nigeria. The study made used of annual data for the period of 1981 to 2025. The econometric analysis was conducted using the ARDL bound test approach to examine the connection between the nation's agricultural output and economic growth. The findings indicate the existence of long-run relationship among variables, likewise short-run relationship. The pairwise granger causality test shows that there is one-way causality moving from agriculture to economic growth. This indicates that agricultural output leads to economic growth, but economic growth does not lead to agricultural output. The results approve the positive link between agricultural output and economic growth, which is helpful to improve the nation's economic outlook.

Adeshina, Tomiwa and Eniola (2020) examined the impact of agricultural financing on economic performance in Nigeria within the sampled period of 1978-2017. The study which utilized data through secondary sources from the Central Bank of Nigeria statistical bulletin. The data were analyzed using the Unit root test, Bound Cointegration test and error correction modelling to empirically estimate the coefficient of parameter estimates. From the result, it was deduced that in the long-run, Agricultural Credit Guarantee Scheme Fund (ACGSF) is the most influential agricultural financing variable (as compared to government expenditure on agriculture and commercial bank credit to agriculture) that contributed to economic performance, as it revealed that (ACGSF) had strong positive impact on the growth rate of the Nigerian economy.

Onoh (2020) examined the nexus between agriculture financing and economic growth in Nigeria for the period 1981 to 2016. The study showed a long and short run relationship between the dependent variable (growth rate of gross domestic product) and the independent variables (agricultural output, agricultural credit guarantee scheme fund, interest rate and commercial bank loans to agriculture). The coefficient of determination showed a low explanatory power of the independent variables on the dependent variable. Prob(F-statistic) of 0.036239 showed that the variables are jointly significant. There is Uni-directional causality relationship between growth rate of gross domestic product and agricultural credit guarantee scheme fund in Nigeria.

Etea and Divine (2019) investigated the contribution of agricultural sector output to the growth of domestic economy in Nigeria for the period 1990-2017. Cointegration test, Vector Error Correction Model (VECM) and variance decomposition test were utilized in the analysis. A stationarity test was conducted through the application of the Augmented Dickey-Fuller (ADF) stationarity test and the result showed that all the variables were stationary at I(I) and 2(I0). The cointegration result ndicated long run equilibrium relationship among the variables under study. The VECM result on the other hand, showed that value of agricultural output has positive and insignificant contribution to GDP. Thus, it is estimated on average that 1% increase in the value of agricultural output would lead to a little increase in real GDP.

Oguwuike (2018) examined the effect of agricultural output on economic growth of Nigeria T (1981-2016). The econometrics methods of ordinary least square, Cointegration, error correction mechanism were used for the analysis. The outcome of the ADF unit root test show that the variables (GDP, crop production, livestock, fishery and forestry) were stationary. Also the co-integration result showed that there exist cointegration amongst the variables in the model. The Parsimonious Error Correction Model 2indicates that the R is 86% meaning that the dynamic model is a good fit. The Durbin Watson value of approximately 2.0, indicates a lesser level of autocorrelation, meaning that the successive values of the error term are serially dependent or correlated. Moreover, the first and third lags of GDP are positively and significantly related to current level of economic growth. The coefficient of crop production is positively signed and statistically significant at 5 percent level with GDP. The coefficient of fishing is positively signed but statistically not significant at 5 percent level with GDP. The coefficient of livestock is positively signed and statistically significant at 5 percent level with GDP. The coefficient of forestry is negatively signed but statistically significant at 5 percent at level with GDP.

Babatunde, Biodun, Ibukun and Bode (2017) examined the impact of Agriculture output on Economic Growth in Nigeria, Data were collected from the World Bank Data base and CBN statistical bulletin. Co-Integration and Vector Error correction model techniques were employed as well as the Granger Causality test to determine the causality relationship between Agriculture and Economic Growth. As a result of the data collected, analyzed and interpreted, the research found that Agriculture has positive and long run impact on Economic Growth in Nigeria.

Awoyemi, Afolabi and Akomolafe (2017) examined the impact of agricultural productivity on economic growth in Nigeria between the periods of 1981 to 2015. The Johansen cointegration test was employed to determine the existence of long run relationship between agricultural productivity and economic growth. Error Correction Model (ECM) was employed to determine the short run impact of agricultural productivity on economic growth. From the results, it was found that the agricultural labour productivity and agricultural value added were the positive determinants of economic growth. The study concluded that improvement in the performance of the agricultural sector has a significant effect on economic growth in Nigeria.

Oyinbo and Rekwot (2014) provided empirical information on the relationship between agricultural production and the growth of Nigerian economy with focus on poverty reduction. Time series data were employed in this research and the analyses of the data were done using unit root tests and the bounds (ARDL) testing approach to cointegration. The result of the data analysis indicated that agricultural production was significant in influencing the favourable trend of economic growth in Nigeria. Despite the growth of the Nigerian economy, poverty is still on the increase and this calls for a shift from monolithic oil-based economy to a more plural one with agriculture being the lead sector.

3. METHODOLOGY

Research Design

The research design adopted for this research is ex-post facto research design. Ex-post facto research design is a quasi-experimental study examining how an independent variable affects a dependent variable.

Data Collection Methods and Sources

In the course of this study and in line with the above submission, the researcher in an attempt to gather useful and reliable information utilized secondary sources of data collection. The secondary data (time series data) were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin. The data covered a period of thirty-eight (38) years which ranged from 1985 to 2022.

Model Specification

Since this study is interested in establishing relationships between variables and possible projections, econometric model is therefore be adopted. The econometric model adopted in this study used to establish the relationship that exists between the dependent variable (economic growth) and the independent variable (agricultural sector output). The model is specified as follows:

$$GDP = f(CRP, FSP, LSP, FRP) \quad (3.1)$$

In econometrics, the above equation (3.1) is not sufficient in specification due to the absence of the constant parameter and error term. Thus, the equation (3.1) above is therefore explicitly stated as follows:

$$GDP_t = \alpha_0 + \alpha_1 CRP_t + \alpha_2 FSP_t + \alpha_3 LSP_t + \alpha_4 FRP_t + et \quad (3.2)$$

The log linear form of the above equation (3.2) is stated below:

$$InGDP_t = \alpha_0 + \alpha_1 InCRP_t + \alpha_2 InFSP_t + \alpha_3 InLSP_t + \alpha_4 InFRP_t + et \quad (3.3)$$

Where: GDP = Gross Domestic Product, CRP = Crop production, FSP = Fishing production, LSP = Livestock production, FRP = Forestry production, $_t$ = Time, α_0 = Regression intercept/constant variable, α_1 - α_4 = Parameter estimates, *et* = Disturbance or error term.

A Priori Expectation

The *a priori* expectation evaluates the parameter in terms of its meeting the standard economic theory expectation. Economic theory explains the nature of the variables being used and their relationship with one another. The evaluation therefore is based on whether the parameter conforms to economic postulations or not as shown in table 3.1.

Table 3.1: Priori Expectation

VARIABLES	Parameters	Expected Sign	Conclusion
Crop production	α_1	+ve	$\alpha_1 > 0$
Fishing production	α_2	+ve	$\alpha_2 > 0$
Livestock production	α_3	+ve	$\alpha_3 > 0$
Forestry production	α_4	+ve	$\alpha_4 > 0$

Source: *Researcher Idea in Line with Economic Theory.*

Variable Description

The variables of this study are classified as dependent variable and independent variable. The economic growth in Nigeria is the dependent variable and it is measured by Gross Domestic Product. On the other hand, agricultural sector output is the independent variable and it is proxied by crop production, fishing production, livestock production and forestry production. These variables are briefly explained as follow:

Gross Domestic Product (Dependent Variable): This is the monetary value of the final output of goods and services produced by manufacturing sector in an economy in a given period of time, usually a year.

Crop production (Independent Variable): This refers to the process of cultivating, growing, and harvesting plants for various purposes, including food, feed, fiber, fuel, and industrial raw materials. It involves the systematic management of crops to optimize their growth, yield, and quality while ensuring sustainable agricultural practices.

Fishing production (Independent Variable): This refers to the activity of capturing or harvesting fish and other aquatic organisms from natural water bodies such as oceans, seas, rivers, lakes, and ponds for commercial or subsistence purposes. It involves various methods and techniques, including the use of nets, lines, traps, or other fishing gear to catch fish and other marine species.

Livestock production (Independent Variable): This is the monetary value of the final output of goods and services produced by livestock production subsector in an economy in a given period of time, usually a year.

Forestry production (Independent Variable): Livestock production refers to the rearing, breeding, and management of domesticated animals for various purposes, such as food, fiber, labor, and companionship. It involves the systematic and controlled raising of livestock species, including cattle, sheep, goats, pigs, poultry, and others, to meet human needs and demands
ormation Criterion-(SIC),

Data Analysis Technique

In this study, method of Ordinary Least Square (OLS) estimation was employed for the analysis. This is because the method of Ordinary Least Square has some very attractive statistical properties that have made it one of the most powerful and popular method of regression analysis. The OLS technique, under certain assumptions has desirable statistical properties (efficiency, consistency and unbiasedness). Estimation was done using E-Views 12 statistical package. Multiple Regression analysis aided the determination of the relationship existing between the explained variable and the explanatory variables.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Statistical Analysis

The section presents the result of descriptive analysis as follow:

Table 1: Descriptive Statistics of Research Variables

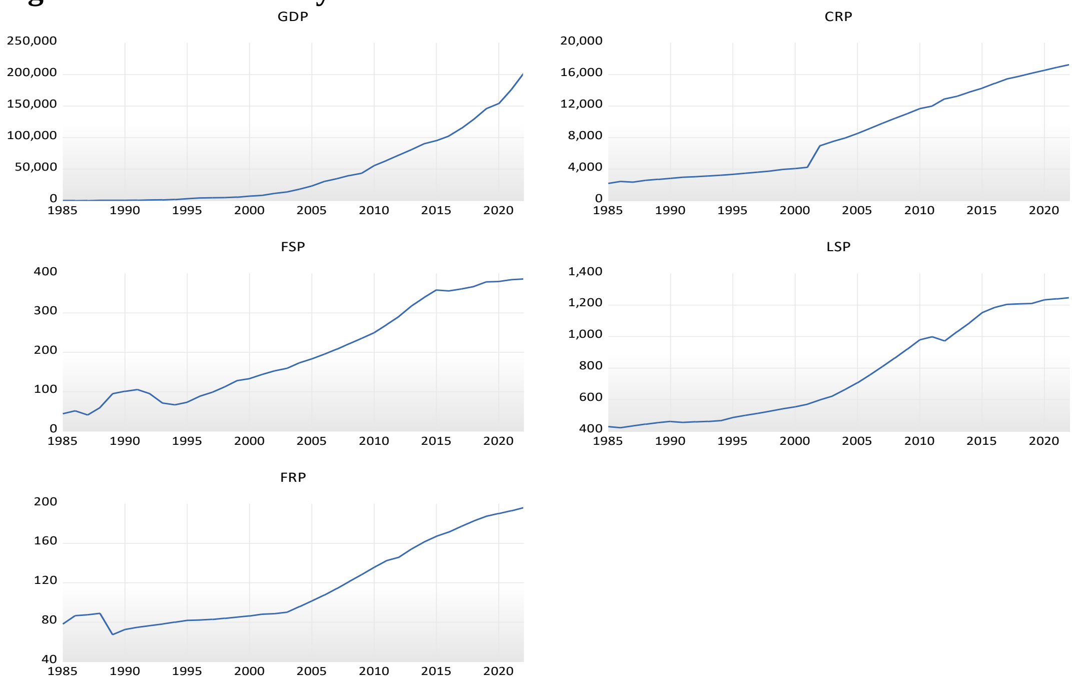
	GDP	CRP	FSP	LSP	FRP
Mean	41593.90	8079.731	191.6432	746.3949	114.5592
Median	13556.97	7493.020	159.2300	622.5600	90.02000
Maximum	176075.5	16920.52	384.4500	1240.220	193.2200
Minimum	187.8300	2180.910	40.65000	421.6300	67.31000
Std. Dev.	51518.03	5169.434	115.5670	296.6352	40.62562
Skewness	1.144615	0.351202	0.426637	0.475766	0.717846
Kurtosis	3.106029	1.570900	1.748043	1.638887	1.997501
Jarque-Bera	8.096543	3.909203	3.538856	4.251983	4.727087
Probability	0.017453	0.141621	0.170430	0.119315	0.094086
Sum	1538974.	298950.1	7090.800	27616.61	4238.690
Sum Sq. Dev.	9.55E+10	9.62E+08	480806.5	3167727.	59415.89

Observations	**38**	**38**	**38**	**38**	**38**

Source: *Authors' EViews Based Results, 2024.*

As shown in Table 1, the Gross Domestic Product (GDP) in Nigeria recorded over the period of 1985 to 2022 a mean average of ₦45824.72 with a maximum of ₦202365 billion and minimum of ₦187.83 billion per annum. In addition, crop production (CRP) had a mean value of ₦8321.34 over the research period of 1985 to 2022 while its maximum and minimum values are ₦7724.84 billion and ₦17260.75 billion respectively. Also, fishing production (FSP) had a mean value of ₦196.76 over the research period of 1985 to 2022 while its maximum and minimum values are ₦386.24 billion and ₦40.65 billion respectively. Moreover, livestock production (LSP) had a mean value of ₦759.58 billion over the research period of 1985 to 2022 while its maximum and minimum values are ₦11247.712 billion and ₦421.63 billion respectively. Lastly, forestry production (FRP) had a mean value of ₦116.71 billion over the research period of 1985 to 2022 while its maximum and minimum values are ₦196.36 billion and ₦67.31 billion respectively.

Figure 4.1: Trend Analysis of Research Variables



Source: *Authors' EViews Based Results, 2024.*

Figure 1 depicts the trend analysis of Gross Domestic Product (GDP), crop production (CRP), fishing production (FSP), livestock production (LSP), forestry production (FRP) in Nigeria which ranged from 1985 to 2022. As it is shown by the graphs, there are high levels of consistencies (mostly upward) in the movements of Gross Domestic Product (GDP), crop production (CRP), fishing production (FSP) and livestock production (LSP) and forestry production (FRP) throughout the research period, that is, 1985 to 2022.

Unit Root Test

The results of the unit root test using Augmented Dickey-Fuller (ADF) approach are summarized in Table 2 below:

Table 2: Unit Root Test Result

Variables	ADF	5% Critical Value	Hypothesis (H_0)	Decision	Order of Integration	Conclusion
InGDP	-4.265037	-2.941145	Presence of Unit Root	Reject H_0	I(0)	Stationary at Level
InCRP	6.595396	-2.938987	Presence of Unit Root	Reject H_0	I(0)	Stationary at Level
InFSP	-7.350427	-2.941145	Presence of Unit Root	Reject H_0	I(0)	Stationary at Level
InLSP	-5.908410	-2.943427	Presence of Unit Root	Reject H_0	I(0)	Stationary at Level
InFRP	-5.908410	-2.943427	Presence of Unit Root	Reject H_0	I(0)	Stationary at Level

Source: *Authors' EViews Based Results, 2024.*

After comparing the ADF statistic against the Mackinnon critical value at 5% level of significance in Table 2, it was observed that Gross Domestic Product, crop production, fishing production, livestock production and forestry production were all stationary at levels. This indicates that Gross Domestic Product, crop production, fishing production, livestock production and forestry production were all stationary at levels and integrated at order zero [i.e. I(0)]. However, the single order of stationarity among the variables necessitates the use of ordinary least square regression technique to estimate the specified regression model.

Regression Analysis

This section analysed the data sourced and presents the empirical results obtained which are econometric in nature. Consequently, the multiple regression model specified earlier i.e. GDP $= \alpha_0 + \alpha_1 InCRP_t + \alpha_2 InFSP_t + \alpha_3 InLSP_t + \alpha_4 InFRP_t + et$ is estimated in this section through Ordinary Least Square (OLS) technique while the data analysis was carried out by EViews 12 statistical package. The results obtained from our data analysis are presented in Table 3.:

Table 3: Results of Multiple Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: InGDP				
C	2.202235	0.888240	2.479324	0.0209
InCRP	0.227025	0.101310	4.283550	0.0000
InFSP	0.597597	0.152085	3.929371	0.0007
InLSP	0.076410	0.244939	0.311954	0.7579
InFRP	0.380109	0.069683	5.454832	0.0000
R-squared = 0.927836 Adjusted R-squared =0.879293 F-statistic = 12.93356 Prob(F-statistic) = 0.000037 Durbin-Watson stat =1.753535				

Source: *Authors' EViews Based Results, 2024.*

1. Interpretation of Parameter Estimates

GDP = 2.202235 + 0.227025[CRP] + 0.597597[FSP] + 0.076410[LSP] + 0.380109[FRP]

Crop production (CRP) and Gross Domestic Product (GDP)

The positive value (0.227025) of the parameter of crop production as shown by the regression results in Table 3 indicates that crop production contributes positively to Gross Domestic Product. The implication of this is that Gross Domestic Product will increase by 22.7% given a percentage increase in crop production while Gross Domestic Product will decrease by 22.7% given a percentage decrease in crop production.

Fishing Production (FSP) and Gross Domestic Product (GDP)

The positive value (0.5975497) of the parameter of fishing production as shown by the empirical results in Table 3 indicates that fishing production contributes positively to Gross Domestic Product. The implication of this is that Gross Domestic Product will increase by 59.8% given a percentage increase in fishing production while Gross Domestic Product will decrease by 59.8% given a percentage decrease in fishing production.

Livestock Production (LSP) and Gross Domestic Product (GDP)

The positive value (0.076410) of the parameter of livestock production as shown by the regression results in Table 3 indicates that livestock production contributes positively to Gross Domestic Product. The implication of this is that Gross Domestic Product will increase by 7.6% given a percentage increase in livestock production while Gross Domestic Product will decrease by 7.6% given a percentage decrease in livestock production.

Forestry Production (FRP) and Gross Domestic Product (GDP)

The positive value (0.380109) of the parameter of forestry production as shown by the regression results in Table 3 indicates that forestry production contributes positively to Gross Domestic Product. The implication of this is that Gross Domestic Product will increase by 38% given a percentage increase in forestry production while Gross Domestic Product will decrease by 38% given a percentage decrease in forestry production.

2. Analysis of R-Squared (R^2)

The R-squared value obtained from the regression results in Table 3 is 0.927836. This implies that the regression line has a good fit as indicated by the R-squared value which is greater than 0.5 or 50 per cent (i.e. 93%) as the case may be. In other words, about 93% of the variations in economic growth as measured by Gross Domestic Product is explained by changes in crop production, fishing production, livestock production and forestry production. The remaining 7% of the variations in Gross Domestic Product are explained by other variables not included in the study as represented by the error term.

3. Analysis of Adjusted R-Squared (R^2)

The adjusted coefficient of determination (Adjusted R-squared) is 0.879293. This shows that the coefficient of determination obtained is reliable. The result also implies that, if the coefficient of determination is adjusted, 88% of the total variations in economic growth as measured by Gross Domestic Product are attributable to changes in crop production, fishing production, livestock production and forestry production. The remaining 12% of the variations in Gross Domestic Product are explained by other variables not included in the study as represented by the error term.

4. Analysis of T-Test

The t-rest was used to test the validity of the parameter estimate. It was used to decide whether the independent variable is individually significant or not. In carrying out this test, the researcher made use of n-k degrees of freedom and 5% level of significance.

Where n = sample size, k = number of parameters.

In this study, n = 38 while k = 5. Thus, n-k = 38 - 5 = 33.

Decision Rule: If the t-calculated value is greater than the t-tabulated value, reject at 5% level of significance, the null hypothesis (H_0) which states that individual parameter in the specified model is not statistically significant. On the other hand, if t-calculated value is less than the t-tabulated value, accept at 5% level of significance, the null hypothesis (H_0) which states that individual parameter in the specified model is not statistically significant.
From statistical table, t-tabulated value at 33 degrees of freedom and at 5% level of significance is 2.037. However, the t-calculated values for all the independents variables, the t-tabulated values, decision rule and conclusion are summarized in Table 4. below:

Table 4: Summary of T-Test

Variables	T-Calculated Value	T-Tabulated Value	Decision Rule	Conclusion
Crop production	4.283550	2.037	Reject H_0	Significant
Fishing production	3.929371	2.037	Reject H_0	Significant
Livestock production	0.311954	2.037	Accept H_0	Not Significant
Forestry production	5.454832	2.037	Reject H_0	Significant

Source: *Authors' EViews Based Results, 2024.*

The summary of our t-test as presented in Table 4. above shows that crop production, fishing production and forestry production are statistically significant. This means that crop production, fishing production and forestry production have individual significant effect on Gross Domestic Product. On the other hand, the results presented in Table 4 shows that livestock production is not statistically significant. This means that livestock production does not exert any significant effect on Gross Domestic Product.

Analysis of F-Test

This test was carried out to test for overall significance of the model. In carrying out this test, the researcher made use of k-1 and n-k degrees of freedom and 5% level of significance.
Where n = sample size, k = number of parameters.
In this study, n = 38 while k = 5. Thus,
k-1 = 5-1 = 4 while n-k = 38 - 5 = 33.

Decision Rule: If the F-calculated value is greater than the F-tabulated value, reject at 5% level of significant, the null hypothesis (H_0) which states that overall parameter estimated is not statistically significant. On the other hand, if F-calculated value is less than the F-tabulated value, accept at 5% level of significant, the null hypothesis (H_0) which states that overall parameter estimated is not statistically significant.
From statistical table, F-tabulated value at 4, 33 degrees of freedom and at 5% level of significance i.e. $F_{0.05}(4, 33)$ is 2.64 while the F-calculated value from the regression result is 12.93356. However, the F-calculated value, F-tabulated value, decision rule and conclusion are summarized in Table 5 below:

Table 5: Summary of F-Test

Variable	F-calculated Value	F-tabulated Value	Decision Rule	Conclusion
Estimated Model	12.93356	2.64	Reject H_0	Significant

Source: *Authors' EViews Based Results, 2024.*

The summary of our F-test as presented in Table 5 above shows that the estimated model is statistically significant. This means that crop production, fishing production, livestock production and forestry production have joint significant effect on Gross Domestic Product which measured economic growth in Nigeria.

Post-Estimation Tests

This study conducts post-estimation test to determine how reliable and valid the result analyzed above were. The results of the post-estimation tests conducted are presented below:

Table 6: Post-Estimation Tests

Test	F-statistic	P-Value	Decision
Normal Distribution	1.077890	0.583363	The null hypothesis of normal distribution is retained
Serial Correlation LM	0.615631	Prob. F(2,30) 0.5470	The null hypothesis of no serial correlation is retained
Heteroscedasticity Test	0.514510	F(4,33) 0.7255	The null hypothesis of homoscedasticity is retained
Ramsey RESET	2.984900	Prob. (1, 32) 0.0940	The null hypothesis of the model being correctly specified is retained

Source: *Authors' EViews Based Results, 2024.*

The result of the normality test in Table 6 showed that the regression residual is normally distributed since the P-value (0.583363) is greater than 5 percent level of significance. In other words, under the Jarque-Bera normality test, a probability value of 0.583363 was greater than the proposed level of significance and this suggests that the errors were normally distributed due to the upholding of the null hypothesis of normal distribution. Also, the result of the serial correlation was shown in Table 6. The serial correlation of the residuals was tested using Breuch Godfrey test or Lagrange Multiplier (LM). This test was carried out to find out whether the residuals are serially independent or not. However, the null hypothesis of no serial correlation was retained because the probability value of 0.5470 was greater than the 5 percent level of significance. This indicates that there was absence of serial correlation in our model. Furthermore, the result of the Heteroscedasticity test in Table 6 showed that there was no heteroscedasticity in our model. This is because the null hypothesis of homoscedasticity was retained. Precisely, a probability value of 0.7255 showed that the errors were homoscedastic and independent of the explanatory variables. Hence, the model has a good fit and is adequate for any conclusion drawn from it. Finally, the result of the serial correlation was shown in Table 6. The probability value of 0.0940 against the Ramsey Regression Equation Specification Error Test (RESET) test was greater than the proposed 5 percent level of significance. As a result, the null hypothesis that the model was correctly specified was sustained. Therefore, there was no possibility of the model being specified incorrectly which may result in the omission of certain variables.

Discussion of Findings

Having analysed the effect of agricultural sector output on the economic growth in Nigeria, the study found that there is a positive and significant relationship between crop production and Gross Domestic Product in Nigeria. The findings relate to the findings of Babatunde, Biodun, Ibukun and Bode (2017) who found that there is a positive relationship between agricultural sector output (as proxied by crop production) and economic growth. The study also found that there is a positive and significant relationship between fishing production and Gross Domestic Product in Nigeria. This result also agrees with that of Oguwuike (2018) who found that fishing is positively signed and statistically significant at 5 percent level with Gross Domestic Product in Nigeria. In addition, the study found there is a positive and insignificant relationship between livestock production and Gross Domestic Product in Nigeria. This results also agree with that of Victoria (2019) who found that livestock production has a positive impact on the performance on economic growth in Nigeria as proxied by Gross Domestic Product. Lastly, the result of the study showed that there is a positive and significant relationship between forestry production and Gross Domestic Product in Nigeria. This finding conforms to the findings of Etea and Divine (2019) which established that agricultural output (AGRIC) exerted significant positive effect on real gross domestic product (RGDP) in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

One sector that has a critical role to play in the Nigerian economy is the agriculture sector as over 40% of the Gross Domestic Product (GDP) comes from the sector and it employs about 60% of the working population. Consequently, economic growth in Nigeria has largely been accounted for by resilient agricultural growth associated with performance in four constituent sub-sectors: crops, livestock, fisheries and forestry. Hence, agricultural sector has in recent years contributed significantly to improved growth performance in Nigeria. Drawing from the foregoing, this study has empirically investigated the effect of agricultural sector output on the economic growth in Nigeria. Based on the findings of the study however, the authors concluded that agricultural sector output is statistically significant and has a significant effect on economic growth in Nigeria.

Recommendations

Based on the theoretical and empirical findings of this study, the following recommendations are made:

1. The Nigerian government should encourage agricultural practices round the country through the provision of modern and affordable farm inputs and equipment to help develop a higher level of food security in the country. This will help Nigerians reduce their high levels of food importation, amongst other forms of agricultural commodities.
2. Government is as well advised to avoid inconsistencies in its agricultural policies and programs; rather, it should embrace consistent, stable and sustainable agricultural policies, as that would help to improve agricultural output in Nigeria.
3. Government should strengthen agricultural credit agencies in order to monitor and ensure efficient disbursement of fund allocated to agricultural producers, in so doing, mismanagement and diversion of agricultural fund in Nigeria would be discouraged, hence, improve agricultural output, which in turn grows the Nigeria economy.
4. The Government should also encourage agricultural research and development, providing modern research facilities which would help improve the quality of agricultural output in the country.

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