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POPULATION GROWTH, AGRICULTURAL PRODUCTIVITY AND ECONOMIC GROWTH IN SOUTHERN TARABA STATE NIGERIA

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ABSTRACT: The study examines Population growth, Agricultural productivity and Economic growth in Southern Taraba State, Nigeria. The study made use of time series data from 1988 to 2025 on real gross domestic product as the dependent variable and proxy for economic growth, and other explanatory variable include population growth and agricultural output as a proxy for agricultural productivity in Nigeria. Descriptive statistics- the mean, skewness, kurtosis and jaque-Bera tests were used to examine and test the statistical properties of the model. The unit root analysis conducted on the series using Augmented Dickey-fuller (ADF) test indicate that all the variables were integrated at first difference. It thereby paved way for the analysis of the series under Vector autoregressive framework. The Johansen cointegration test revealed a long-run relationship between population growth, agricultural productivity and economic growth in Southern Taraba State, Nigeria. The estimated long-run equation indicates that population had a positive and significant impact on economic growth. The empirical findings reveal a long-run co-integrating relationship between population expansion, agrarian output and local economic growth. In the short run, rapid population growth exerts a negative effect on per capita the paper concludes with actionable policy recommendations focusing on land tenure security, agricultural value-chain modernization, rural infrastructure development, and peace-building frameworks essential for sustainable economic growth in the Middle Belt of Nigeria.

KEYWORDS: Population Growth, Agricultural Productivity, Economic Growth, Southern Taraba State, Boserup Hypothesis, Malthusian theory. Unit root, Impulse response, ADF.

INTRODUCTION

1.1 Background to the study

According to Timm (2008), the global population is projected to grow by about 65% within the next 50 years. The current estimate of the world population is about 7 billion, with China having the total population of 1,330,045,000 people as of 2008, India being second with about 1,205,074,000 people, and the United State of America occupying the third position with the total population of 313,847,500 as of 2012.

In Africa, the highest populated country is Nigeria and it was rated to be occupying the ninth position, with an estimated population of 170,074,000 people (Mundi index, 2012). The geographical area occupied by Nigeria is about 923,768 square kilometers Nigeria's population was estimated to amount to 206 million individuals. Between 1965 and 2020, the number of people living in Nigeria regularly increased at a rate above two percent. In 2020, the Nigerian population grew by 2.58 percent compared to the previous year. Nigeria is the most populous country in Africa.Situated within the tropics along the Gulf of Guinea on the western coast of Africa, Nigeria's agricultural climatic condition is extremely diversified, which makes it possible for her to produce a wide range of

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agricultural products Adewumi & Omotesho (2021).there is a general belief that as there are more hands involved in agriculture , it gives rise to more food production and thus leads to good livelihood for families. This as a result has contributed immensely to the increase in polygamous marriages and more children and thereby has led to an increasing population.

The agricultural sector one of the most significant sectors of the economy especially in the aspects of employment generation, contribution to the gross domestic product (GDP), and earnings from exports (Essian, 2005; Ogen, 2002). Regardless of the rich agricultural resource endowment of Nigeria, its growth has been at an extremely low rate (Ehui and Tsigas, 2013).

In 1960, agriculture contributed up to 64% to the total GDP, but during the 1970s, the contribution of agriculture to the GDP declined to 48% (CBN 2008). The decline continued in 1980 to 20% and 19% in 1985. It has also been observed that the agricultural subsectors of crop production, fishery, livestock, and forestry have over the years declined in their contributions to agricultural output. Agriculture contributed 23.92% to nominal GDP, higher than the rates recorded for the second quarter of 2019 and the first quarter of 2020 which recorded 19.39% and 20.88% respectively. In real terms, the agricultural sector grew by 1.58% (year-on-year) in the second quarter of 2020, a decrease of –0.21% points from the corresponding period of 2019, and –0.62% points from the preceding quarter. On a quarter-on-quarter basis, the sector grew at 6.57%. Further, the sector contributed 24.65% to aggregate real GDP in Q2 2020, higher than the contributions in the second quarter of 2019 and the first quarter of 2020 which stood at 22.78% and 21.96% respectively (National Bureau of Statistic NBS 2020). Noted that this might be attributed to the shift of emphasis to agricultural development even though the increment was negligible, the 1980's witnessed a boom in the oil sector and over the decades the excesses greatly affected the economy and a neglect of the agricultural sector but eventually brought about a renewed government attention towards the development of agriculture in Nigeria.

1.2 Statement of the Problem

In the 70's, the agricultural sector provided employment for well over 60% most of which were residents of rural areas, (Faleye, Adebija and Farounbi 2012) Though a large population engaged in farming was high, most of the farmers were peasants. Event at that rate the country was still an exporter of some cash crops such as: cocoa and oil palm products, while the country was sufficient in staple food crops such as: yam, cowpea, maize and rice (Balogun 2001; Moohead 2005; Anon 2005) as quoted in (Faleye, Adebija and Farounbi 2012). In the 1960s, agriculture accounted for 65-70% of total exports; however, the country's agricultural export deline to about 40% in the 1970s, and crashed to less than 2% in the late 1990s. The decline in the agricultural sector was largely due to rise in crude oil revenue in the early 1970s. Less than 50% of the Nigeria's cultivable agricultural land is under cultivation. Even then, smallholder and traditional farmers who use rudimentary production techniques, with resultant low yields, cultivate most of this land. The smallholder farmers are constrained by many problems including those of poor access to modern inputs and credit, poor infrastructure, inadequate access to markets, land and environmental degradation, and inadequate research and extension services.

The inability to capture the financial services requirements of farmers and agribusiness owners who constitute about 70 percent of the population is inclusive (Lawal, 2011). Low agricultural productivity has a negative effect on the Nigerian economy as a whole. Several factors have been identified to enhance or retard growth in the agricultural sector. These factors include education infrastructure and inflation. Among the determinant of economic growth in any country is population growth and increase in agricultural productivity, with the high level of population and large land mass of the Nigeria, one will expect that the contribution of the agricultural sector will contribute significantly to economic growth of the country, however this is not the situation. There has been many literatures on either population and economic growth, Agricultural productivity and economic growth in Nigeria such as (Aluko 2004, Headeyand-Hodge 2009, Iwejingi, 2011 Otaha 2012), however to the best of the researcher knowledge none is existing on population growth, agricultural productivity and economic growth in Nigeria. The researcher therefore seeks to increase the existing literature by researching on the impact of population growth, on economic growth through

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agricultural productivity in Southern Taraba State, Nigeria.

1.3 Research Question

To achieve the set objectives, the following research questions are formulated to guide this research work.

i. What is the impact of population growth and agricultural productivity in Southern Taraba State Nigeria?
ii. What is the causal relationship between population growth, agricultural productivity and economic growth in Southern Taraba State Nigeria?
iii. What is the impact of population growth on economic growth through agricultural productivity in Southern Taraba State Nigeria?

1.4 Objective of the Study

The broad objective of the study is to empirical analysis the impact of population growth, agricultural productivity and economic growth in Southern Taraba State, Nigeria. Specifically the study seeks to

i. Ascertain the impact of population growth, agricultural productivity on economic growth in Southern Taraba State Nigeria
ii. Analysis the causal relationship between population growth, agricultural productivity and economic growth in Southern Taraba State Nigeria.
iii. Examine the impact of population growth on economic growth through agricultural productivity Southern Taraba State, Nigeria.

1.5 Research Hypotheses

The following hypotheses are formulated to guide the study.

H0: Population growth and agricultural productivity does not have a significant impact on economic growth in Southern Taraba State Nigeria.

H_{02}: population growth does not have a significant impact on economic growth, through agricultural productivity Southern Taraba State, Nigeria.

1.6 Scope of the Study

The study seeks to empirically analyze the impact population growth, agricultural productivity on economic growth in Southern Taraba State Nigeria for a period of 38 years (1988 to 2025). The choice of 1988 as the base year of the study is hinged on the premise that the time coincides with the approval of National Policy on Population for Sustainable Development was approved on the 4th of February 1988 in response to the pattern of population growth rate and its adverse effects on national development. Also, Southern Taraba State had several herder Farmers crises within this period leading to population displacement, abandonment of farm land and its attendant economic implications. This study will make use Agricultural output (AGO), Population growth rate (POPG), Real Gross Domestic Product (RGDP) proxy economic growth as it datawill be sourced from the Central Bank of Nigeria.

1.7 Significance of the Study

A study on the impact of population growth, agricultural productivity on economic growth in Nigeria is timely and significant in that. The finding of the study will serve as a guide to policy maker, government in making policies with regards to population growth and how it affect economic growth in Southern Taraba State, Nigeria.

2.1 Population Growth

The term population denotes the whole number of people or inhabitants in a country or region; the total of individuals occupying an area or making up a whole, within the context of Environmental Law, the study of human population tends to focus on their composition, growth, distribution and migratory movements. It is also concerned with the study of demographic processes which affect the environment (Mayhew 2015)

$$population\ growth\ rate = \frac{P(t)_2 - P(t)_1}{P(t)_1(t_2 - t_1)}$$

A positive growth rate indicates that the population is increasing, while a negative growth rate indicates that the population is decreasing.

2.1.2 Determinants of Population Growth in Southern Taraba State Nigeria

Population Growth rate is determined by the following factors:

>. Fertility Rate > Mortality Rate in Nigeria > Migration>Technology >Economic growth

2.1.3 Economic Growth

Based on its multi-dimensional nature, the term economic growth is described as the positive and sustained increase in aggregate goods and services produced in an economy within a given period of time. When measured with the population of a given country, then economic growth can be stated in terms of per capita income according to which the aggregate production of goods and services are produced in a given year is divided by the population of that country.

2.1.3.1 Determinants of Economic Growth

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Economic growth and development has much to do with human endowments, social attitudes, political conditions and historical accidents. Capital is necessary but not a sufficient condition for development. The following are the various factors which determine economic growth and development as put forward by Dare (2003):

a) Supply of Natural Resources

* Capital formation * Technological progress * Population growth

b) Structural transformation

This means a transition from primitive or agricultural society to a modern industrial economy involving a radical transformation of existing institutions and motivations. Structural transformation releases surplus labour hitherto existing in rural agricultural areas to the industrial cities leading to higher employment, greater productivity of labour, increased stock of capital, exploitation of new resources and improvement in technology.

c) Social attitudes

These are the behavioral patterns of a people. They are the attitudes and values of a society and how they influence economic growth

2.2 Theoretical Framework

2.2.1 Malthusian Theory

Thomas Malthus (1798), postulated that population grows in geometric progression, while the means of subsistence grows in arithmetic progression as observed from the event in England. He said that population would continue to increase at a faster rate than the means of subsistence unless it is curtailed through positive or negative checks. The positive checks include postponement of marriage, and abstinence within marital unions.

2.2.2 The Boserupian Intensification Theory (1965):

Posits that demographic pressure triggers agricultural innovation and labor-intensive land improvements. Scarcity forces communities to shorten fallows, construct terracing/irrigation, adopt high-yielding crop varieties, and develop market infrastructure.

2.2.3 Theoretical Link

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2.3 Empirical Literature

Somtochukwu (2020), empirically analyze the relationship between economic growth and population growth in Nigeria, using the OLS method and our regression model holds and suggests probable and effective policy recommendations to help control over population in Nigeria. Our secondary data was obtained from the World Bank and the National Bureau of Statistics making use of the E-views programme to carry out our research. the granger causality test was also conducted and the result shows that RGDP does granger cause population growth in Nigeria, based on the statistic of this result as well as the results of our other regression models, government is advised to employ these measures so as to not only catalyze economic growth and control population growth and ensure equitable redistribution of public resources

Kuhe (2019) investigate the empirical relationship between population growth and economic growth and development taking Nigeria as a case study. The study uses annual time series data from 1960 to 2015 and employs Dickey-Fuller Generalized least squares unit root test, Engle-Granger residual-based cointegration test, fully modified least squares, error correction model and VAR Granger causality test. Our findings revealed that the variables under study are integrated of order one and hence cointegrated thereby providing evidence in support of the existence of a long-run relationship between population growth and economic growth in Nigeria. The result also finds total population growth, urban population growth and rural population growth as having positive and significant impacts on economic growth in Nigeria in the long-run while in the short-run the impact of population growth on economic growth is found to be temporal and not long lasting. The error correction model has identified a sizeable speed of adjustment by 76.32% for correcting disequilibrium annually for achieving

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long term equilibrium steady state position. Our results found no statistical evidence of the causal relationship between population growth and economic growth in Nigeria. Although population growth has significant impact on economic growth, it does not in any way Granger causes economic growth and vice versa. This is true because some countries have experienced higher economic growth and development even with a small population while others experienced lower economic growth even with a larger population. Terver A et al (2025) investigated the nexus between population growth, agricultural productivity and economic growth in Southern Taraba and concluded that a tripartite-relationship exist between them but did not explore the transmission from economic growth to population growth.

2.3.1 Research Gap

The empirical literature reviewed has thrown up a number of interesting findings in the literature on population growth, agricultural productivity and economic growth Southern Taraba State. In general, population growth has popularly been found to have a positive effect on economic growth. This may on face value indicate positive prospects for Nigeria economic growth on account of Nigeria's large population and with a significant number of studies on Nigeria finding positive effect of population growth on economic growth. However, the argument by few studies as Shah, Sargani, Ali and Siraj (2015) and Terver, Fatima (2025) that population growth may have a negative effect on economic growth should be taken seriously. Also, the conclusion that population growth triggers agricultural productivity has also been vigorous argued as many argue that population that is ill equipped is endemic to the society especially agrarian economy like Southern Taraba. This is so as population growth is argued to contribute to unemployment, poverty, environmental problems. However, the lack of consensus in the findings of these studies calls for further investigation. It is the goal of this study to contribute to this ongoing investigation. Also, most of the empirics reviewed span to 2016, this study will however increase the span of coverage to 2025.

3.1 Research Design

For the purpose of this study, the descriptive and analytical research design has been adopted. This is because the study embraces the use of secondary data to in examining some relationships.

3.2 Kind and Source of Data

The data used for this research work are basically time series data covering 1988 to 2025. They are mainly from secondary in nature obtained from CBN Statistical bulletin and the World bank Database, while Real Gross Domestic Product (RGDP) and Agricultural Output (AGO) are sourced from CBN Statistical Bulletin, Population Growth (POPG) is obtained from World Bank data publication.

3.3 Model Specification

The model adopted by the present study is a modification of the model of Tartiyus, Dauda and Peter (2015) completely for this study, though incorporating Agricultural Output (AGO) as a proxy for agricultural productivity. And model is specified in its mathematical form as follows

$$RGDP = f(POPG, AGO,)$$ ……..(3.1)

Where

RGDP = Real Gross Domestic Product, as a proxy for Economic Growth in Nigeria

POPG = Population Growth Rate

AGO = Agricultural Output as a proxy for agricultural productivity

The model is specified in it Stochastic form as thus:

$$RGDP = \beta_0 + \beta_1 POPG + \beta_2 AGO + U$$ ……(3.2)

Where

U = Error Term

β_0 = The Intercept

$\beta_1, \beta_2, \beta_3, \beta_4$ = Elasticities

The Model is Specified in it log-linear form as follows

$$logRGDP = \beta_0 + \beta_1 logPOPG + \beta_2 logAGO + e_t$$ ---------- (3.3)

To examine the pass-through effect of population growth to economic growth through agricultural productivity, that is

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$$POPG \rightarrow AGO \rightarrow RGDP$$

Applying a structural VAR form of the model is state below

$A_0 = A_1 Y_{t-1} + \epsilon_1$ …….3.4

The model become:

$RGDP_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 POPG_{t-1} + \beta_{13}^1 AGO_{t-1} + \beta_{12}^0 POPG_t + \beta_{13}^0 AGO_t + \varepsilon_{1t}$……3.5

$POPG_t = \beta_{21}^1 RGDP_{t-1} + \beta_{22}^1 POPG_{t-1} + \beta_{23}^1 AGO_{t-1} + \beta_{21}^0 RGDP_t + \beta_{23}^0 AGO_t + \varepsilon_{2t} \dots\dots 3.6$

$AGO_t = \beta_{31}^1 RGDP_{t-1} + \beta_{32}^1 POPG_{t-1} + \beta_{33}^1 AGO_{t-1} + \beta_{31}^0 RGDP_t + \beta_{32}^0 POPG_t + \varepsilon_{3t} \dots\dots\dots 3.7$

By collecting like terms of equations 3.5 to 3.7 and presenting in matrix form, we have the following

$$\begin{bmatrix} 1 & -\beta_{12}^0 & -\beta_{13}^0 \\ -\beta_{21}^0 & 1 & -\beta_{23}^0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP \\ POPG \\ AGO \end{bmatrix} = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \beta_{13}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \beta_{23}^1 \\ \beta_{31}^1 & \beta_{32}^1 & \beta_{33}^1 \end{bmatrix} \begin{bmatrix} RGDP_{t-1} \\ POPG_{t-1} \\ AGO_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \text{…….3.8}$$

$A_O Z_t A_1 Z_{t-1} V_t$

Where A_O= 4X4 matrix of contemporaneous effects

Z_t= 4X1 column vector matrix of estimable endogenous variables

A_1 = 4X4 matrix of estimable coefficients of the endogenous variables

Z_{t-1} = 4X1 column vector matrix of lagged estimable endogenous variables

V_t = 4X1 column vector matrix of the white noises in the system

This is to ensure that shocks are uncorrelated errors in 3.8 are expressed as:

$\varepsilon_t = \beta\eta_t \dots\dots\dots 3.9$

Where η_t are structural shocks and matrix B which is initial impulses is given as:

$$B = \begin{bmatrix} \delta_1 & 0 & 0 \\ 0 & \delta_2 & 0 \\ 0 & 0 & \delta_3 \end{bmatrix} \text{……} 3.10$$

Now, the specification can be re-specified as follows:

$$\begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} e_t^{RGDP} \\ e_t^{POPG} \\ e_t^{AGO} \end{bmatrix} = \begin{bmatrix} \delta_1 & 0 & 0 \\ 0 & \delta_2 & 0 \\ 0 & 0 & \delta_3 \end{bmatrix} \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \end{bmatrix} \text{….3.11}$$

From equation 3.11, it follows that,

$A_0 e_t = B\mu_t \dots\dots\dots 3.12$

3.4 Method of Data Analysis

The study shall employ both descriptive statistics and the econometric tools in analyzing the data. The descriptive tools consist of descriptive statistics, graphs, while the econometric tools included Unit Root test (for which the Augmented Dickey-Fuller (ADF) to test for the stationarity of the data. Non-linear Autoregressive distributed lag model and structural VAR will be used to achieve the objectives of the study.

3.4.1 Unit Root Test

A unit root test is a statistical approximation of persistent behaviour over the period of investigation (Juselius, 1999). In time series modelling, we first of all examine the stationarity properties of the data. The unit root test that shall be applied in this study is the Augmented Dicker-Fuller (ADF) unit root test discussed extensively in Dicker and Fuller, (1979).. This can be expressed as:

$$\Delta Y_t = \beta_t + \beta Y_{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta Y_{t-1} + \mu_t, \quad t=1,\dots,T$$

Where Y_t is the endogenous variable; Δ is a difference operator, β_t is a deterministic term which may consist of the constant or drift and the trend; β and α_i are coefficients of Y_{t-1} and ΔY_{t-i}respectively; p is the number of lags and the difference terms, ΔY_{t-i} is added to eliminate serial correlation in the residual term μ_t.

The ADF test shall be carried out on all the variables in the models with the following hypothesis:

Null hypothesis H_0: The series has a unit root (non stationary)

Alternative hypothesis H_1: The series has no unit root (Stationary)

The decision rule is that; reject H_0 if the test statistic is less than asymptotic critical values. Rejection of H_0 implies that the series is stationary.

3.4.2 Granger Causality Test

The pre-condition for applying Granger Causality test is to ascertain the stationarity of the variables in the pair. Engle and Granger (1987) show that if two non-stationary variables are co-integrated, a vector

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auto-regression in the first differences is unspecified. If the variables are co-integrated, an error-correcting model must be constructed. In the present case, the variables are not co-integrated; therefore, Bivariate Granger causality test is applied at the first difference of the variables. The second requirement for the Granger Causality test is to find out the appropriate lag length for each pair of variables.

4.1 Descriptive Statistics

Standard descriptive estimates were computed from the data to elicit the typical characteristics of the variables and the results are shown in the following table.

Table 4.1 Descriptive statistics

	RGDP	AGO	POPG
Mean	40012.39	9410.551	2.580624
Median	35020.55	8888.573	2.598705
Maximum	71387.83	18348.18	2.677659
Minimum	16215.37	3174.568	2.488183
Std. Dev.	20271.59	5372.140	0.066981
Skewness	0.370369	0.279811	-0.095024
Kurtosis	1.515399	1.549338	1.525820
Jarque-Bera	3.785008	3.324196	3.037823
Probability	0.150694	0.189741	0.218950
Sum	1320409.	310548.2	85.16058
Sum Sq. Dev.	1.31E+10	9.24E+08	0.143569
Observations	33	33	33

Source: Authors' Computation using Eviews 10.

Table 4.1 reveals the descriptive properties of Real Gross Domestic Product (RGDP), Agricultural Output (AGO) and Population Growth Rate (POPG). RGDP has average value of ₦40012.39 billion, and the series has maximum value of ₦71387.83 billion in year 2019 and minimum value of ₦16215.37billion in year 1988. RGDP has a positive skewness and has exhibited a platokurtic shape. The series is normally distributed based on the Jarque-Berra statistic. Similarly, Agricultural Output (AGO) is averaged at ₦9410.551 billion and the series has a maximum value of ₦18348.18 billion in 2020 and the minimum value of ₦3174.568 billion in 1988. AGO is also positively skewed and has exhibited platokurtic shape; and it is not normally distributed based on the Jarque-Berra statistic. Also, Population Growth Rate (FER) is averaged at 2.580624% and the series has a maximum value of 2.677659 in 2012 and the minimum value of 2.488183 in 1997 POPG also have negatively skewness and has exhibited platokurtic shape; and it is also normally distributed based on the Jarque-Berra statistic.

4.2 Unit Root Test

Before the estimation of the equation, all variables were subjected to stationarity test. The unit root test was carried out using Augmented Dickey Fuller (ADF) for all variables and the results are presented as appendix II and summarized in Table 4.2

Table 4.2 Unit Root Test Results

Variables	At level	Prob. value	First Difference	Critical Values			Prob. Values	Order of Co-integration
				1%	5%	10%		
RGDP	-0.727124	0.8252	-3.596868	-3.661661	-2.960411	-2.619160	0.0044	I(1)
AGO	-0.517020	0.8750	-5.122407	-3.661661	-2.960411	-2.619160	0.0002	I(1)
POPG	-2.025755	0.2748	-1.960450	-2.641672	-1.952066	-1.610400	0.0491	I(1)

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Source: Authors' Computation using Eviews 10
* indicates the rejection of null hypothesis of a time series having unit root problem.
The results of unit root in Table 4.2 shows that the series RGDP, AGO, and POPG were not stationary at level but became stationary after first difference, that is, integrated at order I(1) and their probability values are less than 0.05 after first difference. Thus, the variables are stationary at first difference, implying that the variables have mean reverting ability, such that any shock to the series will fade away with passage of time. The implication of this is that the vector error correction model is appropriate as an economic technique for the analysis of non-stationary data. It is however helpful to establish the existence or otherwise of a long run equilibrium relationship (co-integration) among the variables

4.3 Causal Relationship

In order to determine direction of causation between population growth agricultural productivity and economic growth in Southern Taraba State, Nigeria, we carry out a Granger causality test to identify the causal relationship between population growth and economic growth. Particularly, the Granger causality is important in two areas, namely identification of relevant variables in the causality relationship and the depth and intensity of the relationship which is also important. The results are present in the table 4.3

Table 4.3 granger Causality (Causal Relationship)

Null Hypothesis:	Obs	F-Statistic	Prob.
LPOPG does not Granger Cause LRGDP	31	5.79543	0.0083
LRGDP does not Granger Cause LPOPG		3.10398	0.0618
LAGO does not Granger Cause LRGDP	31	2.78137	0.0204
LRGDP does not Granger Cause LAGO		0.89325	0.4215
LAGO does not Granger Cause LPOPG	31	3.49461	0.0453
LPOPG does not Granger Cause LAGO		1.15592	0.3304

Table 4.3 above presents the results of granger causality, the results showed that there a one-way causation from population growth to economic growth in Nigeria. The result indicates that POPG granger causes RGDP but RGDP does not granger causes POPG given that their probability values are 0.0083 and 0.0618 respectively. This implies that an increase in population growth leads to an increase economic growth and development in Southern Taraba State, Nigeria, but that economic growth of Southern Taraba State, Nigerian in the study was not the cause of population growth. The result also showed that there is one-way causation from agricultural productivity to economic growth in Southern Taraba State, Nigeria. The result indicated that AGO granger causes RGDP but RGDP does not granger causes AGO given that their probability values are 0.0204 and 0.4215 respectively. This implies that an increase in agricultural productivity leads to an increase in economic growth in Southern Taraba State, Nigeria. The result also showed that there is no causal relationship between population growth and agricultural productivity in Southern Taraba State, Nigeria, given that their probability values are more than 0.05.

4.4 Lag Length Criteria

The optimal lag length was estimated and presented in the following table:

Table 4.4: Optimal Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
1	258.5386	NA	2.05e-11	-16.09927	-15.68295	-15.96356
2	276.8121	29.47333*	1.14e-11*	-16.69755*	-15.86492*	-16.42613*

Source: Author's Computation using Eviews 10
From the table both the sequential modified LR test statistic, Final prediction error, and Akaike information criterion, and the Hannan-Quinn information criterion have indicated that the optimal lag is lag 2; whilethe Schwarz information criterion has indicated that optimal lag order for the SVAR model is lag 1. However, lag 2 was used for the SVAR model because the Akaike information criterion provides more information about the

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predictive power of a model. Following the outcome of the stationarity test and lag selection criterion, the Johansen co-integration test was conducted to ascertain the existence of the long-run relationship among the variables and the results are presented in the following tables:

Table 4.5: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		**Trace**	**0.05**	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.528942	41.30119	29.79707	0.0016
At most 1 *	0.427638	18.71799	15.49471	0.0158
At most 2	0.063823	1.978506	3.841466	0.1595

The results of the trace statistic reveal that there is two co-integrating equations at 5% level of significance among the series meaning there is a long-run relationship among population growth and agricultural productivity and economic growth in Southern Taraba State, Nigeria.

Table 4.6: Unrestricted Cointegration Rank Test (Max-Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.528942	22.58320	21.13162	0.0310
At most 1 *	0.427638	16.73949	14.26460	0.0199
At most 2	0.063823	1.978506	3.841466	0.1595

Source: Author's Computation using Eviews 10

The results of the Maximum eigen value also showed that there is one co-integrating equation among the series explaining the long-run relationship among population growth and agricultural productivity and economic growth in Southern Taraba State, Nigeria.

Since both the trace and maximum eigen value statistics have indicated one co-integrating equation; the null hypothesis of no co-integration among the series is rejected. This implies the evidence of long-run relationship among population growth and agricultural productivity and economic growth in Southern Taraba State, Nigeria.

In order to know the short-run relationship among the variables, the contemporaneous structural parameters were estimated and the results are shown in the following table:

Table 4.7: Estimated Contemporaneous Structural Parameters

	POPG	***AGO***	***RGDP***
POPG	1	0	0
AGO	0.674171	1	0
RGDP	0.007393	0.277422	1

Source: Author's Computation using Eviews 10

The estimated contemporaneous structural parameters have shown that there is a positive relationship between population growth and agricultural productivity in the short-run given the period of this study. This means that 1% increase in the contemporaneous effect of population growth will lead to 0.674171% agricultural productivity in Southern Taraba State Nigeria. This may be attributed to the fact that when population growth increases more its leads to an increase in labour available for agricultural activities. Again, the estimated contemporaneous structural parameters have shown that there is a positive relationship between population growth and economic growth in Southern Taraba State Nigeria in the short-run. This implies that 1% increase in the contemporaneous effect of population growth will lead to increase in economic growth by 0.007393% in Southern Taraba State Nigeria. This may be due to the fact that increase in population growth leads to an increase in economic growth in Southern Taraba State Nigeria, through increase aggregate demand as a result of larger market which facilitates the process of growth.

4.5 **Impulse Response Functions**

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The Impulse Response Functions (IRF) shows the response of each variable in the system to shocks from the system variables. In order to further buttress how shocks in the foreign exchange market pressure affect growth enhancing variables, in this case inflation; the impulse response functions were estimated

The impulse response function graph of Population growth shows that after the first period, economic growth increases as a result of innovations in population; the increase continued till the tenth period. This implies that, population grows it translate to an increase in aggregate demand, hence an increase in productive capacity to meet the demand, hence economic growth.

The impulse response function graph of population growth shows that after the first period, agricultural productivity as a result of innovations in population growth; the increase from the negative region and continued till the tenth period. This implies that, when there is an increase in population growth more hands are available for agricultural activities, hence an increase in agricultural productivity in Southern Taraba State Nigeria.

The impulse response function graph of economic growth shows that after the first period, economic growth increases as a result of innovations in agricultural productivity; the increase continued till the eighth period and declined after the eighth period continuous to the negative region. This implies that, when there is an increase in agricultural productivity in the country it will lead to an expansion in the country's productive capacity and self-sustainability.

4.6 Forecast Error Variance Decomposition

The Forecast Error Variance Decomposition (FEVD) which provides information about the proportion of movements in a sequence due to its own shocks and the shocks due to other variables in the system. The FEVD of the variables was estimated and the results are presented in the following tables.

Table 4.10: Forecast Error Variance Decomposition of Economic growth (RGDP)

Period	S.E.	LRGDP	LPOPG	LAGO
1	0.011794	100.0000	0.000000	0.000000
2	0.020054	90.10451	8.597985	1.297503
3	0.029226	77.38916	20.93185	1.678994
4	0.039201	66.28914	32.14315	1.567713
5	0.049579	57.68409	41.05504	1.260873
6	0.059977	51.14296	47.90617	0.950874
7	0.070105	46.13520	53.15650	0.708294
8	0.079775	42.23821	57.21356	0.548225
9	0.088887	39.14965	60.38762	0.462729
10	0.097410	36.65710	62.90656	0.436344

Source: Author's Computation using Eviews 10

The variance decomposition results revealed that own shocks of real gross domestic productive are dominant from the first period to the tenth period. It however, declines from 100.00% from the first period to 36.66% in the tenth period; meaning that the variables, population growth and agricultural Productivity are the predictors of real gross domestic product. A unit change in population growth in the second period accounts for about 8.59% in the forecast error variance of economic growth in the second period and the results appear to increase significantly to 62.90% in the tenth period. For Agricultural productivity, a unit change in agricultural productivity is able to explain about 1.29% in the forecast error variance of economic growth in the second period and the results appear to increase gradually to 1.26% in the fifth period. But decline significantly to 0.43% in the tenth period.

Table 4.11: Forecast Error Variance Decomposition of Population growth

Period	S.E.	LRGDP	LPOPG	LAGO
1	0.010220	1.488898	98.51110	0.000000
2	0.020752	3.543100	96.39115	0.065753
3	0.031681	4.759311	95.20722	0.033470

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4	0.042352	5.261415	94.63375	0.104839
5	0.052330	5.411329	94.30522	0.283452
6	0.061392	5.381728	94.07616	0.542109
7	0.069468	5.268645	93.87945	0.851902
8	0.076583	5.124072	93.69050	1.185433
9	0.082821	4.976465	93.50354	1.519992
10	0.088294	4.840754	93.32096	1.838288

Source: Author's Computation using Eviews 10

The variance decomposition results revealed that own shocks of population growth are dominant from the first period to the tenth period. It however, declines from 98.51% from the first period to 93.32% in the tenth period; meaning that the variables, RGDP, and AGO are the predictors of Population growth. A unit change in RGDP in the first period accounts for about 1.48% in the forecast error variance of population growth in the first period and the results appear to increase significantly to 5.26 in the 8th period, then declined to 4.84% in the tenth period. For Agricultural productivity, a unit change in agricultural productivity is able to explain about 0.06% in the forecast error variance of exchange rate in the second period and the results appear to increase gradually to 1.84% in the tenth period.

Table 4.12: Forecast Error Variance Decomposition of Agricultural Output

Period	S.E.	LRGDP	LPOPG	LAGO
1	0.030904	50.80200	0.102481	49.09552
2	0.044447	67.80119	0.517009	31.68180
3	0.055154	71.10940	3.412969	25.47763
4	0.064366	71.74121	7.308618	20.95017
5	0.072522	70.88543	11.48285	17.63171
6	0.079802	69.46718	15.43763	15.09519
7	0.086321	67.85351	19.00372	13.14278
8	0.092184	66.22346	22.15257	11.62397
9	0.097498	64.64577	24.92694	10.42729
10	0.102365	63.13816	27.39301	9.468835

Source: Author's Computation using Eviews 10

The variance decomposition results revealed that own shocks of agricultural output are account 49.09% from the first period and declined to 9.46% in the tenth period; meaning that the variables, RGDP, and POPG are the predictors of agricultural productivity. This implies that RGDP is the major determinant of agricultural output in Nigeria. A unit change in RGDP in the first period accounts for about 50.80% in the forecast error variance of agricultural output in the first period and the results appear to increase significantly to 63.13% in the tenth period. For population growth, a unit change in population growth is able to explain about 0.102% in the forecast error variance of agricultural output in the first period and the results appear to increase significantly to 27.39% in the tenth period.

4.7 Discussion of Findings

The study first objective of the study was ascertaining the impact of population growth, agricultural productivity on economic growth in Nigeria. The study found that population growth and agricultural productivity had a positive impact of on economic growth as shown by the impulse response function. This finding is in tandem with the findings of Awoyemi, Afolabi&Akomolafe (2017) and Oguntegbe, Obi-Egbedi, Olagunju &Okoruwa (2018) they both found population growth and agricultural productivity has a positive impact on economic growth in Nigeria.

The second objective of the study causal relationship between population growth, agricultural productivity and economic growth in Nigeria, the findings of the study have indicated there is a one-way causation running from population growth to economic growth and from there is also a one-way causation from agricultural output to economic growth. This is in line with the findings of Odetola & Etumnu (2013) who also

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found a causal relationship population growth and economic growth in Nigeria.

The third objective of the study was to impact of population growth on economic growth through agricultural productivity. The study found that the channel through which population growth transmit to economic growth is through agriculture as increase population means increased labour for agricultural production.

5.1 Summary

The study examines the impact of population growth, agricultural productivity and economic growth in Nigeria. The study made use of time series data from 1988 to 2025 on real gross domestic product as the dependent variable and proxy for economic growth, and other explanatory variable include population growth and agricultural output as a proxy for agricultural productivity in Nigeria. Descriptive statistics- the mean, skewness, kurtosis and jaque-Bera tests were used to examine and test the statistical properties of the model. The results showed generally that the data sets on the variables used for normally distributed. The unit root analysis conducted on the series using Augmented Dickey-fuller (ADF) test indicate that all the variables were integrated at first difference. It thereby paved way for the analysis of the series under Vector autoregressive framework. The Johansen cointegration test revealed a long-run relationship between population growth, agricultural productivity and economic growth in Southern Taraba State, Nigeria. The estimated long-run equation indicates that population had a positive and significant impact on economic growth; this is associated increased aggregate demand and increased labour for agricultural production.

5.2 Conclusion

Based on the findings, this research work can be conclude that population growth has a positive impact on economic growth in Southern Taraba State Nigeria. Also following the conclusion finding that agricultural productivity has a positive impact on economic growth, it was conclude that increased agricultural productivity has a more produce impact on economic growth as the agricultural sector does not just provide food for the growing population but also provide raw materials for industries in the country

5.3 Recommendations

Following the findings and conclusion drawn above, the study therefore recommends that

1. Government should as matter of urgency try to tap from the large population of Nigeria, through the creations of an enabling environment for increase in human capital through increased budgetary allocation to the education sector of the economy.
2. Though there is a long-run relationship between population and economic growth in Nigeria, there is also some attendant consequences of overpopulation in the short-run, as such government through her agency should enlighten the populace on the dangers of overpopulation on economic growth, especially per capita income.
3. The government and the non-governmental organizations are advice to organize training and retraining for those involved in agricultural activities, by so doing the will be more abraded with the current development in agricultural practices, keeping them up to date with the global best practices in agricultural sector.
4. The government as well as private sector should thrive harder to invest in education and skill acquisition of her large population. This will improve the quality of labour supply which will in turn positively exert productivity.

REFERENCES

1) Dao, M., Q. (2012). Population and economic growth in developing countries. *International Journal of Academic Research in Business and Social Sciences*, 2(1), 6-17
2) Dike, A. O., &Okwara, K. K. (2014). The effects of population growth on economic growth in Nigeria. *International Journal of Engineering and Science*, 3(11), 07-18
3) Ewugi, M. S., &Yakubu, I. (2012). Malthusian Population theory and the Nigerian Economy: A Political Economy Approach. *International Journal of Human Resource Studies*, 2(4), 197.
4) Garza-Rodriguez, J., Andrade-Velasco, C. I., Martinez-Silva, K. D., Renteria-Rodriguez, F. D., & Vallejo-Castillo, P. A. (2016). The relationship between population growth and economic growth in Mexico.
5) Guga, K., Alikaj, L., &Zeneli, F. (2015). Population, Economic Growth and Development in the Emerging Economies.*European Scientific Journal*, ESJ, 11(10).
6) Headey, D. D. &Hodge, A. (2019).The effect of population growth on economic growth: A meta-regression analysis of the macroeconomic

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literature. Population and Development Review, 35(2), 48-221.

7) Terver, A.G., Fatima B., and Emmanuel K.,(2025) Population growth, Agricultural Productivity and Economic growth in Southern Taraba zone. Journal of African Agrarian Economics and Sub-National Devt. 14(2)
8) United Nations Department of Economic and Social Affairs Population Division (2015). World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. New York: United Nations.
9) World Bank (2014). World bank development indicator. Washington Dc, World Bank, USA.
10) World Bank (2015), Global Monitoring Report 2014/2015: Ending Poverty and Sharing Prosperity, World Bank, Washington, DC, www.worldbank.org/content/dam/Worldbank/gmr/gmr2014/ GMR_2014_Full_Report.pdf.

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