



**IMPACT OF ECONOMIC GROWTH ON FOOD SECURITY IN NIGERIA:
A TIME SERIES ANALYSIS (1981-2024)**

¹Shamaki, I. S., ²Ojoko, E. A. and ²Danmusa, A. H.

¹Department of Agricultural Economics and Extension,
Federal University of Agriculture Zuru, Kebbi State, Nigeria.

²Department of Agricultural Economics, Federal University Dutsin-Ma, Katsina State, Nigeria.

Corresponding Author's Email: ibraimsanishamaki@gmail.com, **GSM:** +2347038099647

ABSTRACT

The study investigates the impact of economic growth on food security in Nigeria using time-series data from 1981 to 2024, sourced from the Central Bank of Nigeria (CBN) and the World Bank's World Development Indicators (WDI). The methodology includes trend analysis, the Autoregressive Distributed Lag (ARDL) bounds test, and the Vector Error Correction Model (VECM). The trend analysis shows that Nigeria's population growth rate decreased from 2.8% in 1982 to 2.1% in 2024, driven by improved education and socioeconomic development. Unit root tests confirm mixed stationarity at I(0) and I(1), while the ARDL bounds test establishes a long-run cointegration relationship (F-statistic of 6.455). Long-run estimates indicate that Real Government Expenditure ($\Delta \{TGEX\}$) significantly increases food security, with a one-unit rise yielding a 0.156-unit improvement. In the short run, the model exhibits a good fit ($R^2 = 0.742$), with an adjustment speed of 61% toward long-run equilibrium. While current government spending positively impacts food security, lagged expenditure shows a negative effect, emphasizing the need for sustained long-term investments over short-term interventions. The study concludes that economic growth has a positive and significant long-run effect on food security but a negative short-run effect. To ensure food sufficiency, the study recommends expanding and mechanizing large-scale agricultural production using modern technology.

Keywords: GDP, Food-security, Production, Economic Growth

INTRODUCTION

Feeding the world population of over seven billion people remain a major global challenge. Hunger and food insecurity have continued to rise, currently affecting over 30% of the world's population (Sibanda and Mwamakamba 2021). Food and Agriculture Organization of United Nation FAO, (2021) estimated that 927.6 million people experienced food insecurity at various points throughout 2020, with Africa accounting for 346.6 million (37.3%) of this total (Xiao, *et al.*, 2021). Food security is a complex, multifaceted concept usually influenced by culture, environment and geographical location (EIU, 2018). According to the food and Agriculture Organization of the United Nations (FAO) gave a clear definition which implies across (individual, household, national, region and global) as "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for active and healthy life" (Perez-Escamilla *et al.*, 2017). Food insecurity poses a significant hurdle for developing countries including Nigeria. Over the last 30 years, domestic agricultural output in Nigeria has failed to keep pace the rapidly expanding population, which grew from 122 million in the year 2000 to an estimated 229-233 million by 2024 United Nations Conference on Trade and Development (UNCTAD, 2024).

Accessibility to food has become a challenge to many Nigerians. Data from World Development Indicators (2024) shows that per capita income has witnessed marginal increase in Nigeria the ability of Nigerians to access food dropped as per capita income declined to US \$1968.565 in 2017, only increasing to US \$2097.092 in 2020 and US\$ 2447.64 in 2024. Meanwhile, the purchasing power of real income has weakened as inflation remain in the double digits-climbing from 9.5% in December, 2015 to 18.17% in March 2021, and subsequently rising to 31.43% (CBN, 2024). From policy standpoint, economic development can be defined as efforts that seek to improve the economic well-being and quality of life for a community by creating and/or retaining jobs and supporting or growing



incomes. It is a sustained community effort to improve both the local economy and the quality of life by building area's capacity to adapt to economic change (Loveridge and Morse, 2016).

Consequently, the objective of this study is to analyse the historical trends of both economic growth and food security in Nigeria, determine the impact of economic growth on food security in Nigeria.

METHODOLOGY

Method of Data Collection

This study utilizes Secondary time series data covering a 43-year period from 1981 to 2024. The data was obtained from various sources including CBN annual report and statistical bulletin and World Bank, National Bureau of Statistics. Reliance was placed on data from these agencies because of their method of data collection and the integrity of the data. Further, the chosen span of 43 years provides an adequate sample size to capture the long-term effects of the explanatory variables on the dependent variable.

Analytical Techniques

To examine the properties of the data, unit root tests were conducted using Eviews 10. Following the discovery that the variables exhibit mixed orders of integration, a trend analysis was performed to identify the underlying directional patterns of the variables subsequently, the Autoregressive Distributed Lag (ARDL) bounds testing approach was employed to analyse both the short-run and long-run relationships among the variables was utilized so as to establish their short run as well as the long run cointegration relationship.

Model Specification

The model specification details the functional form, the mathematical representation and the econometric forms required for estimation.

The functional form of our model is thus stated:

$$FPI = F(RGDP, INFLR, EXH, RGE) \quad \dots (1)$$

The general multiple linear regression which represents the econometric form that will be estimated if the variables are all integrated at level is as follows

$$LFPI_t = \beta_0 + \beta_1 LR GDP_t + \beta_2 LINFLR_t + 3LEXH_t + \beta_4 LRGE_t + u_t \quad \dots (2)$$

FPI_t Is Food Production Index (a proxy for food security)?

$RGDP_t$ Is Real Gross Domestic Product (a proxy for economic growth indicator)

$INFLR_t$ Is Inflation Rate

EXH_t Is Exchange Rate

RGE_t Is Real Government Expenditure

β_0 Is Regression Constant

β_1 to β_4 Are the various Coefficients of the Independent Variables and U_t is Error term.

L is Natural Logarithm

Short Run ARDL Model

$$\Delta LFPI_t = \beta_0 + \beta_1 \Delta LR GDP_t + \beta_2 \Delta LINFLR_t + \beta_3 \Delta LEXH_t + \beta_4 \Delta LRGE_t + - \sum_{i=1}^n FPI_{t-i} + \sum_{i=1}^m X_{t-i} + u_t \quad \dots (3)$$

Where $\sum_{i=1}^n FPI_{t-i}$ the autoregressive part of the model is as the dependent variable regresses its past value based on the lag selected as $i = 1, 2, 3, \dots, n$ and $\sum_{i=1}^m X_{t-i}$ represents the distributed lags aspect of the model where the various independent variables are distributed based on the lags selected as $i = 1, 2, 3, \dots, m$.

The Long Run VECM Model

$$\Delta LFPI_t = \beta_1 \Delta LR GDP_t + \beta_2 \Delta LINFLR_t + \beta_3 \Delta LEXH_t + \beta_4 \Delta LRGE_t \quad \dots (4)$$

Where $\beta_1 \Delta LR GDP_t$, $\beta_2 \Delta LINFLR_t$, $\beta_3 \Delta LEXH_t$, $\beta_4 \Delta LRGE_t$ are the various short run variables with their coefficients

RESULTS AND DISCUSSION

Trend of Economic Growth and Food Security in Nigeria

Figure 1, illustrates that Nigeria’s economic growth maintained a steady upward trend from 1981 to 2019, followed by a sharp decline in 2020. According to World Bank, (2022) Nigeria’s GDP growth rate has been fluctuating over the years, the poor performance of agriculture sector amidst increasing population, for instance, the performance of economic growth has been relatively suboptimal the economy recorded a near-zero growth rate between 1991 to 1995, while the best period for the Nigerian economy since the present democratic dispensation occurred during 2001 to 2005, which saw an all-time high growth rate of 8.8%. The moderate performance of the economy in this period was occasioned by the rising price of crude oil on the global market. It continued on a progressive trajectory up to 2014, when a 6.2% growth rate was recorded for the economy, the growth of the economy declined in 2015 and finally not recovered before the advent of the coronavirus pandemic in December 2019 that disrupted the world economy and economy increased again in 2021 to 2024.

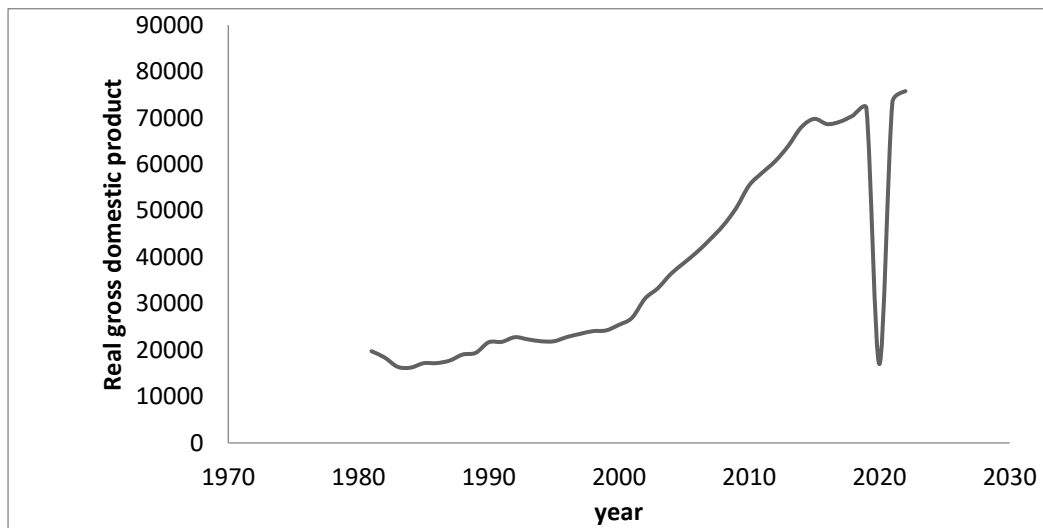


Figure 1: Trend of Economic Growth in Nigeria

Figure 2, shows the trend in food productions, which initially expanded steadily during Fourth National Development Plan (1981-1985) took a cue from the third National development plan. Thus, it sought to further improve food productivity and strengthen self-sufficiency. To achieve these objectives, the initiatives worked with other government institutions like the Ministry of Agriculture and Water Resources, Ministry of Labour, Ministry of Commerce, the River Basin and Rural Development Authority (RBRDA) and ADP. It plummeted in 2006 and increased again in 2007 after which it nose-dived again, reaching its lowest in 2008. Its continuous drop and increased between (2009 to 2012) a possible reason for this observed trend is the several agricultural intervention programmes targeted at food production as well as increase in farmers’ productivity. The government thus, restated its commitment to face-out hunger and malnutrition through ensuring adequate food supply. To achieve this according to Ojo and Adebayo (2012), the government initiated a number of food security initiatives, which include: Special Program for Food Security (SPFS), Root and Tuber Expansion Program, Fadama Development Project and Community-based agricultural and rural development schemes. Food production continued to show steady improvement from 2013 through 2024.

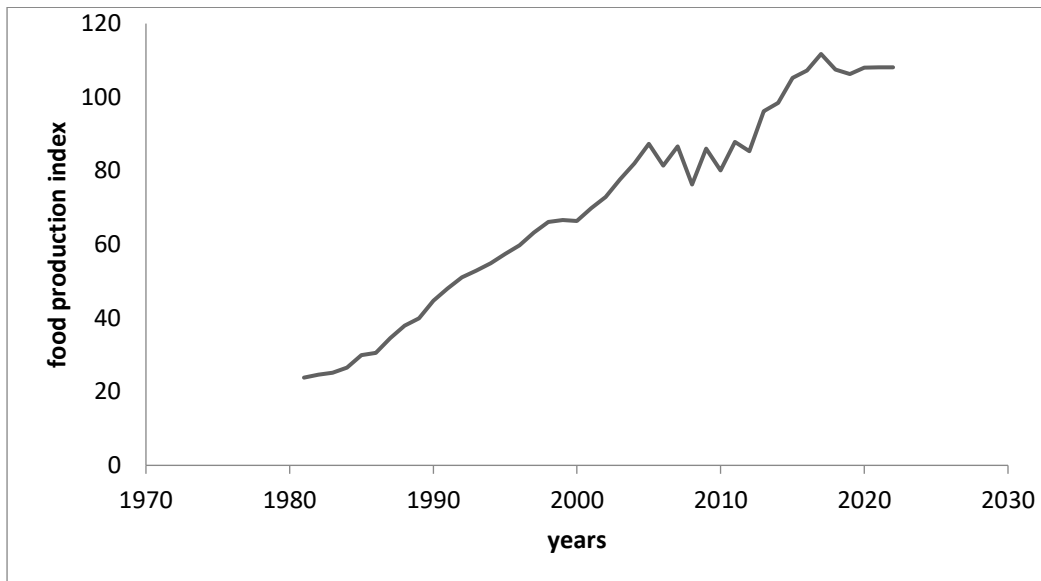


Figure 2: Trend of Food Security in Nigeria
Source: Authors Computation with E-view 10, 2024

Unit Root Test Result

A stationary test using the Phillips-Perron (PP) test was conducted to determine the integration order of the time-series variables.

The results in Table 1 indicated that, Phillips-Perron (PP) under intercept test result indicate that log Food Production Index (LFPI), has no unit roots means that they are stationary at level I(0), while Exchange Rate (EXCR), Real Government Expenditure (TGEX), Inflation Rate (INFR), and Real Gross Domestic Product (RGDP) were not stationary at level form but became stationary after first difference which implies that the variables were integrated of order I(1). PP with trend and intercept test result indicate that Real Gross Domestic Product (RGDP) has no unit root means that they are stationary at level I (0), while Log Food Production Index (LFPI), Inflation Rate (INFR), Real Government Expenditure (RGE) and Exchange Rate (EXHR), were not stationary at level form but became stationary after first difference which implies that the variables were integrated of order I(1). The decision is based on the fact that PP statistics is greater than the PP critical value at 5% level of significance, we reject H_0 and conclude that the variables are stationary at level.

Table 1: Phillip-Perron (Pp) Unit Roots Test

VARIABLES	INTERCERPT			TREND AND INTERCEPT		
	AT LEVEL	AT FIRST DIFFERENCE	ORDER OF INTERGRATION	AT LEVEL	AT FIRST DIFFERENCE	ORDER OF INTERGRATION
LFPI	4.62**	-	I(0)	0.49	9.82**	I(1)
INFLR	3.33	9.99**	I(1)	3.23	9.75**	I(1)
EXHR	1.26**	5.03	I(1)	1.86**	4.96	I(1)
RGDP	1.73	18.41**	I(1)	5.41**	—	I(0)
TGEX	0.977	12.76	I(1)	3.27**	15.1	I(1)

Source: Authors computation with E-view 10, 2024

Legend: (*), (**) and (***) Denote Significance Level at 10%, 5% and 1% Levels.

Expected Outcome After Unit Root Tests Result

For this research, the series are integrated at different order 1(0) and 1(1). Therefore, cointegration test was performed to determine if there is a long-run relationship between the dependent variable and the independent variable. The appropriated cointegration test that was used bound test proposed by Pesaran *et al.*, (2001). “ARDL”



Estimation Results

Autoregressive Distributed Lag (ARDL) Bound Test of Co-integration Result

The F-test was conducted to determine the existence of long-run relationship between population growth and economic growth on food security in Nigeria as shown in Table 2 below. The results indicated that the calculated F-statistic (6.455) is greater than the critical value for the upper bound I (1), and then we conclude that there is co-integration (Pesaran *et al.*, 2001). The finding indicated the presence of a long-run relationship. Consequently, the null hypothesis is rejected, and the long-run model is estimated using the Vector Error Correction Model (VECM).

Table 2: F-Bound Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance level	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.455442	10%	1.92	2.89
K	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9
Actual Sample Size	42		Finite Sample: n=45	
		10%	2.131	3.223
		5%	2.504	3.723
		1%	3.383	4.832

Source: Authors Computation with E-view 10, 2024

Long Run Estimates of the ARDL Model between Economic Growths on Food Security in Nigeria

Table 3 present the long run estimate, the coefficient of Total Government Expenditure (TGEX) is positive and statistically significance with food security on long run relationship, this implies that a one unit increases in TGEX will lead to 0.156 increases in food security. The implication here is that if government expenditure is supporting farmers with better resources, such as subsidies inputs (seeds, fertilizers), access to credit and technology, additionally, investments in infrastructure like irrigation, rural roads and storage facilities would likely improve, aiding both smallholders and commercial farmers. This aligns with Abdulrahman, (2013), who argued that strategic increases in government expenditure on public infrastructure positively impact economic performance.

Table 3: Long-Run ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP	0.015	0.03	0.458	0.650
LTGEX	0.156	0.022	7.155	0.000***
LINFR	-0.001	0.016	-0.091	0.927
LEXHR	0.005	0.033	0.169	0.866
C	-8.557	2.784	-3.073	0.004***

Source: Authors Computation with E-view 10, 2024

Legend: (*), (**) and (***) Denote Significance Level at 10%, 5% and 1% Levels.

Vector Error Correction Model (VECM)

The VECM results in Table 4 showed a coefficient of multiple determinations (R^2) is 0.74. This shows that about 74% of the total variations in the dependent variable (LFPI) were accounted for by the joint action of the explanatory variables. The adjusted R^2 is 0.71 indicating that reduction in the degree of freedom as a result of the inclusion of additional explanatory variable may not significantly alter the goodness of fit of the regression plane.



The VECM variable shows a negative sign. Hence, it is correctly signed. A VECM (-1) coefficient of -0.609 shows a speed of adjustment of about 61% to long run relationship equilibrium from short run disequilibrium.

In the short term, current Total Government Expenditure (Δ TGEX) has a positive statistically significance impact on food security, while the previous year Total Government Expenditure Δ TGEX (-1) have a negative impact, and statistically significance related with food security at 1% level of probability in the short run. This implies that a one unit increases in Δ TGEX will lead to 0.0686 increases in food security and on the other hand a one unit increases in previous year Total Government Expenditure Δ TGEX (-1) will lead 0.0383 decreases in food security in the current year. The implication here is that what government spent on previous year is not enough therefore, negative government expenditure on food security might indicate a reliance on short term solutions, like food imports or subsidies, rather than sustainable investments in agricultural productivity such an approach could weaken local agriculture, making Nigeria more dependent on imports and exposing it to global market fluctuations, which can harm food security. According to finding of Abdulrahman (2013) to cushion the food crisis, government is forced to make provision to increase its expenditure on overheads in the areas of agriculture and food production.

Table 4: ARDL VECM Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTGEX)	0.068641	0.008829	7.774042	0.000***
D(LTGEX(-1))	-0.038265	0.010183	-3.757627	0.008**
CointEq(-1)*	-0.609422	0.070512	-8.642840	0.000***
R-squared	0.741995	Mean dependent var		0.034377
Adjusted R-squared	0.706161	S.D. dependent var		0.04684
S.E. of regression	0.029642	Akaike info criterion		-4.067655
Sum squared resid	0.031632	Schwarz criterion		-3.819417
Log likelihood	91.42076	Hannan-Quinn criter.		-3.976666
Durbin-Watson stat	1.857596			

Source: Authors Computation with E-view 10, 2024

Legend: (*), (**) and (***) Denote Significance Level at 10%, 5% and 1% Levels.

Residual Diagnostic Normality Test

The Jarque-Bera test was used to check the normality of the residuals. The p-value indicates that the residuals are normally distributed and meet the assumption of the classical linear regression model. The p-values for the Jaque-Bera test (0.335) are greater than 0.05%, therefore, we concluded that the residual is normally distributed. The Jarque-Bera test state that, if the test statistic is greater than the critical value at a given significance level, then the null hypothesis that the residual is normally distributed is accepted.

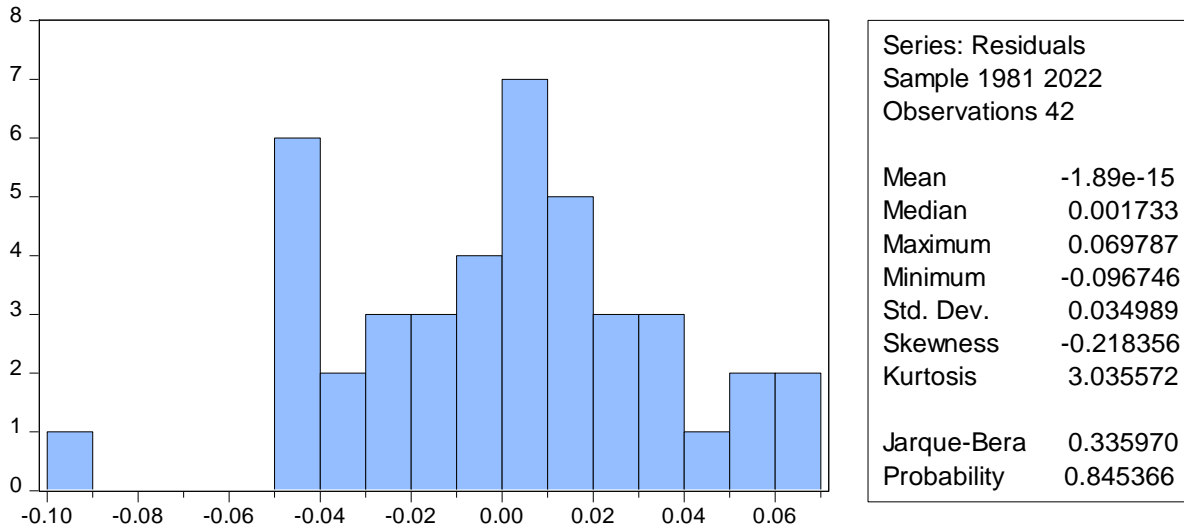


Figure 3: Jaque-Bera Normality Test Result

Source: Authors Computation with E-view 10, 2024

Ramsey Reset Test

The Ramsey Reset tests was conducted to evaluate the functional form specification of the model. The p-value (0.351) is greater than the standard 0.05 threshold, confirming that the model is correctly specified. Following Orji *et al.*, (2020) also used 0.05% as critical value.

Table 5: Ramsey Reset Test Result

	Value	Df	Probability
t-statistic	0.946	33	0.351
F-statistic	0.895	1, 33)	0.351
Likelihood ratio	1.124	1	0.289

Source: Authors Computation with E-view 10, 2024

CONCLUSION AND RECOMMENDATIONS

This study examined the trend analysis of economic growth and food security and estimated long run and VECM short run-on economic growth on food security on food security. The findings reveal fluctuations in economic growth and food security, characterized by periods of decline and expansion. Economic growth has a positive and statistically significance on food security on long run but has negative and statistically significance on food security on short run. The study also identified that if government expenditure is supporting farmers with better resources; it would likely improve the economy of a nation.

From the findings of the study and the conclusions above, the following are hereby recommended for policy actions:

- i. Doubling of food production through large scale agricultural production, mechanized and technologically induced crop production to guarantee food sufficiency should be encouraged among farmers.
- ii. Strengthen long-term growth policies to sustain food security such as investment in agricultural infrastructure, technology adoption and rural development.
- iii. Mitigate short-run negative impacts through safety nets like social protection measures such as targeted food assistance, subsidies for staple goods and emergency food reserves should be implemented to safeguard vulnerable populations during periods of rapid economic adjustment.



REFERENCES

- Abdulrahman, S. (2013). Population growth and food security in Nigeria (2010-2012). *Nigerian Chapter of Arabian Journal of Business and Management Review*, **1**(3): 41-53.
- Afzal, M., (2009). Population Growth and Development in Pakistan, *the Open Demography Journal*, **2**: 1-7.
- Ali, S., Ali, A. and Amin, A (2013). The Impact of Population Growth on Economic Development in Pakistan. *Middle-East Journal of Scientific Research* **18**(4): 483-491.
- Aroyehun, AR. (2023). Impacts of Climate change and population growth on food security in Nigeria. *Bsj Agri*, **6**(3): 232-240.
- Central Bank of Nigeria, (2024) statistical bulletin public finance. www.cbn.gov
- EIU (2018). Global food security index (2018) Building resilience in the face of rising food-security risks. A report from The Economist Intelligence Unit.
- FAO. (2021). Perspective study on agriculture development in the Shellian countries. *African Journals Online*, **3**: 22-35.
- Loveridge, S., and Morse, G.W (2016). Impact of Insecurity on Nigeria Economic Growth and Development. *International Journal of Development and Economic Sustainability*, **10**(5): 1-13.
- Pesaran, M.H., Shin, Y., and Smith, R.J. (2001). Bound testing approaches to the Analysis of level relationships. *Journal of applied econometrics*, **16**(3): 289-326.
- Pesaran, M.H., and Shin, Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. In S. Strom (Ed.), *chapter 11 in econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*. Cambridge University Press: Cambridge.
- Perez-Escamilla, R., Gubert, M.B., Rogers, B and HromiFiedler, A. (2017). Food security measurement and governance: Assessment of the usefulness of diverse food insecurity indicators for policy makers. *Global Food Security*, **14**: 96-104.
- Tasnim, K., & Hossain, M. (2021). The interaction between food security and economic growth: evidence from a dynamic panel threshold regression. *Journal of Economic Studies*, **48**(2): 479–501.
- Njoroge, R., & Adeyeye, O. (2018). Does food security promote economic growth in Sub-Saharan Africa? *Research in International Business and Finance*, **44**(4): 128-136.
- Sibanda LM, Mwamakamba SN. 2021. Policy considerations for African food systems: Towards the United Nations 2021 Food Systems Summit. Sustainability, 13. <https://doi.org/10.3390/su13169018>
- Oguntegbe, K. F., Okoruwa, V. O., Obi-Egbedi, O., and Olagunju, K. O. (2018). Population growth problems and food security in Nigeria. *SSRN Electronic Journal*. <https://dx.doi.org/10.2139/ssrn.3330999>
- Ogunleye, O.O., Owola, O.A., and Mubarak, M. (2018). Population Growth and Economic growth in Nigeria: *An appraisal international journal of management, Accounting and Economics*, **5**(5): 282-299.
- Ojo, E.O and Adebayo, P.F. (2012). Food Security in Nigeria: An Overview. *European Journal of Sustainable Development*, **1**(2): 199-222.
- Osabuohien, E. O., & Ighodaro, O. O. (2020). The impact of food security on economic growth: Evidence from Sub-Saharan Africa. *Sustainability*, **12**(15): 5941.
- Osabohien *et al.*, (2018): Article: - An econometric Analysis of food security and Agricultural Credit Facilities in Nigeria. *The open Agricultural journal*, **12**: 227-239
- Omotunde, L E., and *et al.*, 2023: Effect of exchange rate and inflation rate on Agricultural sector output in Nigeria. *Journal of economics and Allied Research*, **8**(1): 253-267.
- Onime, BE. (2019): Population, food security and Economic Growth in Nigeria. *International journal of Economics, Commerce and Management United Kingdom*, **11**(5): 238-248.
- Orji, A., Ogbuabor, J. E., Iwuagwu, Ch., Anthony-Orji, O. I. (2020). *Empirical analysis of the impact of population increases on the economic growth of Africa's most populous country*. Socio-



Nigerian Journal of Agriculture and Agricultural Technology (NJAAT)
Volume 6, Number 2A, June 2026
ISSN (Print): 2811-1885; ISSN (Online): 2811-1893



economic research bulletin, *Visnik social'no-ekonomičnih doslidžen'* (ISSN 2313-4569), Odessa National Economic University, Ukraine. 2(73): 27–45.

United Nations Conference on Trade and Development (2024). World Investment Report. UNCTAD. <https://unctad.org>

World Bank (2020). *Can Africa Claim the 21st Century?* Washington D.C; World Bank

Xiao, J., Juodis, A., Karavias, Y., and Sarafidis, V. (2021). Improved Tests for Granger Non-Causality in Panel Data. Discussion Papers 21-06. Department of Economics, University of Birmingham. Available online at: <https://ideas.repec.org/s/bir/birmec>. Html