



Food Security and Economic Development in Nigeria. DOLS Approach

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Abstract

This study examined the link between food security and economic development in Nigeria from 1980 to 2025. The indicators used are per capital income as dependent variable while dietary energy supply, food accessibility, food availability, food utilization, food production value and food stability are the independent variables. The data were sourced from the Central Bank of Nigeria (CBN) statistical bulletin. The study employed the dynamic Ordinary Least Square (DOLS) and the R² result is 0.568510 or 56 % in absolute term. The DW statistics indicates the findings could be used for policy formulation given the value of 1.643283 or close to 2. The study concludes that food security index proxy such as dietary energy supply, food accessibility, food availability, food utilization, food production value and food stability significantly impacts on the economic development of the Nigeria. The study recommends government intervention in the economy by giving loans to farmers and ensuring steady electricity supply in the economy as this will lead to better performances in Nigeria.

Keywords: energy supply, food accessibility, food availability, food utilization, food production value.

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Article history

: Wosu, Chidi
: submitted; 2025/03/15 revised; 2026/05/03 accepted; 2026/06/10 published; 2026/07/25



1. Introduction

Background to the study

The food and agriculture organization in 2013 reported that Nigeria consumes 1730 kcal of energy and 64g of protein per capita per day, which is much less than the minimum recommended daily consumption of 2500–3400 kcal. This demonstrates that an imbalanced diet that causes a variety of deficiency symptoms is a problem in Nigeria (Idabacha, 2014). According to the Global Food Security Index (GFSI 2015), which ranks 109 nations, Nigeria is ranked 91st with a score of 37.1 on the affordability, availability, quality, and safety indices. According to statistics, food availability was 39.15% in 1990, while it was 64.5% in 2000. In 2010 and 2022, food availability was 85.95% and 119.85% respectively [1]. Similarly, food accessibility in 1990, 2000, 2010 and 2022 was 2.41%, 29.60%, 100% and 421% respectively [2]. This revealed consistent increase in food production and food accessibility during these periods. On the other hand, food affordability in 1990 was 33.1%, 38.1% in 2000, 23.67% in 2010 and 14.35% in 2022. This showed that affordability of food has been decreasing due to high food inflation ((Idabacha, 2014). Food stability was 20.7kg/cap in 1990, 28.6kg/cap in 2010, 28.2kg/cap in 2013 and 33.0% in 2022. It also implies that food supply has not been stable. Food insecurity is elevated in Nigeria [3]. Data from FAO of the United Nations showed that the cost of a healthy diet per person per day in 2022. Studies on food security and economic development in Nigeria using the Autoregressive Distributed Lag (ARDL) approach reveals a symbiotic long-run relationship. It highlights that agricultural investments and consistent government spending are critical to overcoming food insecurity and stimulating sustainable national growth [4]. The number of people without enough, adequate and safe food to eat on a regular basis remains stubbornly high, at over 900 million (Food and Agriculture Organization (FAO), 2010) and is not falling significantly. Also according to a World Food Program estimate, hunger affects one out of seven people on the planet. In where food is produced, yet they are net food buyers rather than food sellers. Over 60% of the world undernourished people live in Asia, and a quarter in Africa. The opposite of food security is food insecurity. Food insecurity continues to be a key development problem across the globe, undermining people's health, productivity, and often their very survival [5], [6]. Since the attainment of food security in any country is usually an insurance against hunger and malnutrition, both of which slow down economic development, all developed and developing countries must provide policies and strategies to increase their food production capacity. Generally, a country is food-secure when a majority of its population has access to food in sufficient quantity and quality consistent with decent existence at all times [7]. It has been documented since the 1980s, that the achievement of food security requires paying attention to supply-side, which can be secured through agricultural production, commercial imports or food aid and on the demand-side food has to be safe, nutritious, and appropriate to meet food preferences. The situation in Nigeria, like any other African country is not different, Recent estimates put the number of hungry people in Nigeria at over 53 million, which is about 30 percent of the country's total population of roughly 150 million; and 52 percent live under the poverty line and the figure will have become higher since the recent flooding in certain parts of the country [8], [9]. Besides being the leading economy in Africa, Nigeria account for over 20 percent of sub-Saharan Africa population. These are matters of grave concern largely because Nigeria was self-sufficient in food production and was indeed a net exporter of food to other regions of the continent in the 1950s and 1960s. The discovery of crude oil and rising revenue from the country's petroleum sector encouraged official neglect

of the agricultural sector and turned Nigeria into a net importer of food. By 2012 the federal ministry of agriculture estimated that Nigeria was spending over \$3billion annually on food imports which is roughly N450 Billion; when juxtaposed in relation to our annual budget. If Nigeria could actually boost her production of food and agriculture, it won't only lead to her achieving food security, but will also lead to becoming an important revenue earner for and that will translate to unprecedented economic growth which would assist in the actualization of economic development [10]. Nigeria is facing the twin problem of hunger and poverty despite its natural position as a green area with huge resource endowment. It manifests most of the characteristics of Sub Saharan Africa which has about the largest absolute increase of 72 million people in the last decade. About 70 percent of Nigerians live on less than N100 / day (US\$ 0.7/day), while youth unemployment is close to 90 percent. The country has a large informal sector in which a substantial number of the unemployed take up employment. The poverty syndrome is a bit difficult to understand with Nigeria being the sixth world highest producer of crude oil and earning upwards of US\$ 15 billion annually [11]. Regrettably in 2002 alone, 80 percent of the earning was spent on maintaining the government, leaving only 20 percent for economic development. This partly explains the nature of budgetary problems facing the nation. 2010, FAO estimated that more than one (1) billion of the world's people did not have enough food to lead healthy and productive lives. Ironically, the highest proportion of the food insecure live in rural areas 2010, FAO estimated that more than one (1) billion of the world's people did not have enough food to lehealthy and productive lives. Ironically, the highest proportion of the food insecure live in rural\

Dependency Theory of Economic Development The dependency theory was developed by Prebisch highlights the alleged constraints placed on them by the international political and economic system, dependency theory aims to explain why some countries are underdeveloped. It argued that developing countries were structurally disadvantaged and dependent on developed countries for their own development, leading to unequal power dynamics and economic relationships. Based on the theory, the impoverishment of the developing countries can be attributed to their alleged forced integration into the European economy as suppliers of cheap labour or raw materials. This theory forms the theoretical framework for this study because it laid emphasis on the role played by agriculture in attaining sustainable development in an economy [12]. The theory assumes that food imports contribute to food insecurity and the resultant effect is food inflation which increases vulnerability to external market fluctuations and destabilizes local economies. In order to lower their rates of malnutrition, it also criticized export agriculture and pointed out that the poorer countries should use agricultural lands for domestic production. Dependency theorists contend that meeting the needs of the impoverished is the only way to advance each country's interests, and this can be achieved by investing in agriculture and maintaining food security.

2. Methodology

Shamaki, Ojoko and Danmusa, study investigates the effect of economic growth on food security in Nigeria by means of time-series data from 1981 to 2024, sourced from the Central Bank of Nigeria (CBN). The study's methodology includes trend analysis, the Autoregressive Distributed Lag (ARDL) bounds test, and the Vector Error Correction Model (VECM). The trend analysis indicates that Nigeria's population growth rate declined from 2.8% in 1982 to 2.1% in 2024, driven by improved education and socioeconomic development. Unit root tests ascertained mixed stationarity at $I(0)$ and $I(1)$, while the ARDL bounds test establishes a long-run co-integration affiliation (F-statistic of 6.455). Long-run estimates designate that Real Government Expenditure {TGEX} significantly upsurges food security, with a one-unit rise yielding a 0.156-unit improvement. In the short run, the model shows a good fit given an $R^2 = 0.74274$ per cent, with an adjustment speed of 61 % toward long-run equilibrium in absolute term. The current government spending positively effects food security, lagged expenditure displays 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 outcome 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. Okafor, Nzeribe and Uzonwanne study investigated the effect of food security on economic development in Nigeria using autoregressive distributed lag model (ARDL) estimation technique with time series data from 1990-2023.

3. Result and Discussion

The ARDL results revealed that an upsurge in food utilization amplified economic development in the short run, and lessened it in the long run. Furthermore, the results exhibited that food availability, food accessibility and food stability decreased economic development in the short run. Meanwhile, in the long run, food availability, food accessibility, and food stability increased economic development in Nigeria. Furthermore, food inflation and climate change have negative impact on economic development in Nigeria both in the long and short run. Arable land however has positive impact in the short run and negative impact in the long run. Consequently, it is recommended that local food markets be promoted, small and medium sized enterprises be encouraged to invest in agro-processing by creating an enabling environment for to strive and providing incentives for them. Similarly, the issue of insecurity should be tackled so that farmers can access farmlands [13]. Akinola and Ohonba investigated the connection between food security, government spending, and economic growth in Nigeria by adopting time series data from 1980 to 2021. Trend analysis and the autoregressive distributed lag (ARDL) model were employed in the study. The GDP growth rate, food production index, and other relevant variables were dependent and independent variables, respectively [14]. While the food production index, government capital spending, and inflation rates showed a negative relationship with economic growth, food security, government recurrent spending, and gross fixed capital formation had a positive impact on growth in the long run. In the short run, all the independent variables, except the food production index, exhibited a significant impact on economic growth. While the food production index and inflation rate showed a negative relationship with economic growth, other explanatory variables had a positive impact on growth on the short-run horizon.

Goyilla, Abubakar and Abdullahi studied how food security is a foundation for attaining national development in Nigeria in 2024. Using qualitative method, and content analysis, the study found that food insecurity impedes the country's progress [15]. According to the study's findings, if food insecurity is not addressed, Nigeria will have a hard time meeting its national development objectives. Adekunle and Sulaimon examined the nexus between food stability and economic development Nigeria for the years 2011 to 2022. The study examined food stability metrics, economic growth rates, and rural development indicators through a multiple regression analysis. The findings highlighted a strong relationship between food stability and economic development. The study advocated for more effective food distribution channels and rural development programs. Okonkwo and Nwankwo investigated the implications of food stability for economic development in Nigeria from 2010 to 2022. The study considered variables like food stability indices, economic development indicators, and regional agricultural outputs, using fixed-effects regression analysis. Results showed that improved food stability positively impacts economic development, and the study suggested enhancing regional agricultural policies to improve food security and economic outcomes. Ojima and Ogu study examined food security and economic development in Nigeria. To this effect, time series data for 39 years (1980-2018) was employed from CBN bulletin and world bank development indicators. Macroeconomic variables such as; per capita income (endogenous variable); food production index, food importation bill and agriculture contribution to GDP was used as the exogenous variables. The study used Auto Regressive Distributed Lag (ARDL) analysis in analyzing the long run and short run of the data. However, from the result Food production index had a positive insignificant long run relationship with economic development. This is because food production is expected to increase the productivity of the economy, reduce the importation of staple foods, and increase a Nations foreign earning [10]. Nigeria however is still a net importer of food, thus its insignificant relationship with economic development in Nigeria. The study hence concludes that food security significantly impact on Nigeria's economic development. And it was recommended that, Nigeria should reduce her food import bill, as that will afford her the opportunity to utilize her foreign reserve on more capital intensive imports. The government should direct and prioritize the agricultural sector, as that will not just ensure it attains food security, but will increase employment, and income to the populace [11].

Model specification

This study investigated food security and economic development from 1990- 2025 by adopting the model of Ojima and Ogu (2022) which is specified as;

$$PCI = f(FPRI, FIMB, AGGP).....(1)$$

Where

PCI = per capital income

FPRI = food production index

FIMB = food importation bill

AGDP = agriculture contribution to GDP.

Thus, the adopted model was modified as to reflect essential food security index. Our model is a linear one of the form:

$$PCI = f(X_i) \dots \dots \dots (2)$$

$$PCI = F(X_i) \dots \dots \dots (3.1)$$

Where;

PCI = Per capita income and X_i = set of chosen explanatory variables.

The chosen variables are reflected in the model as

$$PCI = f(DESP, FOAB, FODA, FOUT, FPDV, FOSB) \dots \dots \dots (3)$$

Where

PCI = per capital income (a Proxy for economic development)

DESP = dietary energy supply (a proxy for food security)

FOAB = food accessibility (a proxy for food security)

FODA = food availability (a proxy for food security)

FOUT= food utilization (a proxy for food security)

FPDV = food production value (a proxy for food security)

FOSB= food stability (a proxy for food security)

The mathematical model is given as thus;

$$PCI_{t-1} = \beta_0 + \beta_1 DESP_{t-1} + \beta_2 FOAB_{t-1} + \beta_3 FODA_{t-1} + \beta_4 FOUT_{t-1} + \beta_5 FPDV_{t-1} + \beta_6 FOSB_{t-1} + +U_{t-1} \dots$$

Where

Δ = difference operator and μ =white noise

μ_t = Error term, β_0 = Intercept

$\beta_1 - \beta_6 > 0$ are parameter estimates

Table 1. Estimated Long-Run Result (DOLS).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.057973	20.5105	0.318275	0.0519
PCI	0.047900	1.00 821		0.0447
DESP	0.0479 9	0.484851	2.594203	0.0001
FOAB	0.03532	0.305982	4.044828	0.0321
FODA	0.035321	1.246587	2.760023	0.0412
FOUT	0.031644	0.463278	2.551178	0.0275
FPDV	0.030985	0.564823	2.244900	0.0532
FOSB	0.021171	0.305982	2.190507	0.0332
R² =		F-Stat.	Prob. =	DW = 1.
0.568510		=5.709379	0.047640	643283

Source: Author's computation from E-Views 2025. Level of significance at 5%

4. Discussion of results:

Dynamic Ordinary Least Square test (DOLS)

The result from the estimated level from the DOLS indicates that R^2 is 0.568510 implying that 56 per cent of the total variation in economic development is explained by the independent variables. The remaining 44 per cent are variables not included in the model but are captured by the error term. The F-statistic value of 5.709379 [12]. This suggests that the overall regression is statistically significant at 5 per cent level of significance. Durbin-Watson stat value is 1.643283 and indicates presence of positive first –order serial auto-correlation in the model.

Dietary energy supply and per capita income in Nigeria

The coefficients of dietary supply is 0.047995. 1 point increase in dietary supply increases economic development by 0.047995 and relationship is positive and statistically significant at 5% level of significance given the t-statistics of 2.594203. This means that increased attention to dietary supply will boost per capita income in Nigeria [13], [14].

Food accessibility and per capita income in Nigeria.

The coefficients of Food accessibility is 0.034505. 1 point increase in Food accessibility increases economic development by 0.034505 and relationship is positive and statistically significant at 5% level of significance given the t-statistics of 4.044828. This means that increased access to Food accessibility will enhance per capita income in Nigeria.

Food availability and per capita income in Nigeria

The coefficients of food accessibility is 0.035321. 1 point increase in Food accessibility increases economic development by 0.035321 and the relationship is positive and statistically significant at 5% level of significance given the t-statistics of 2.760023. This means that increased access to Food accessibility will enhance per capita income in Nigeria.

Food utilization and per capita income in Nigeria

The coefficients of food utilization is 0.031644. 1 point increase in Food utilization increases economic development by 0.031644 and the relationship is positive and statistically significant at 5% level of significance given the t-statistics of 2.551178. This means that increased food utilization will improve per capita income in Nigeria [15].

Food production value and per capita income in Nigeria

The coefficients of Food production value is 0.030985. 1 point increase in Food production value increases economic development by 0.030985 and the relationship is positive and statistically significant at 5% level of significance given the t-statistics of 2.244900. This means that increased Food production value will improve per capita income in Nigeria.

Food stability and per capita income in Nigeria

The coefficients of Food stability is 0.021171. 1 point increase in food stability increases economic development by 0.021171 and the relationship is positive and statistically significant at 5% level of significance given the t-statistics of 2.190507. This means that increased Food stability will improve per capita income in Nigeria [16].

Stability test

Figure 1. Conceptual Framework of the Relationship Between Food Security and Economic Development in Nigeria.

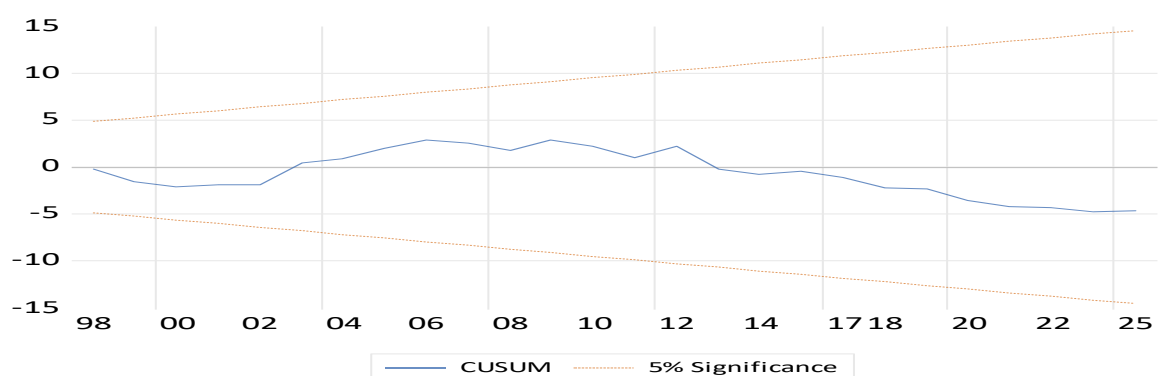
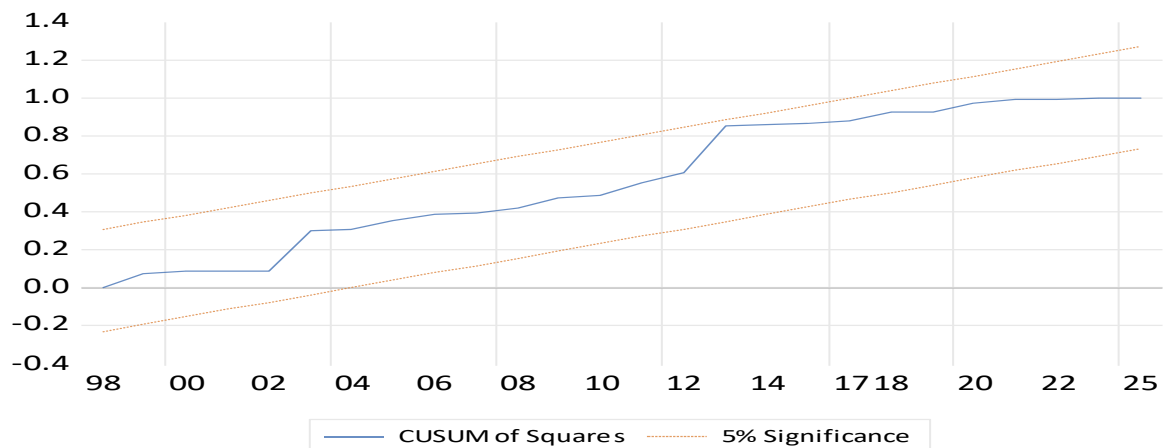


Figure 2. CUSUM Stability Test Results.

The CUSUM and CUSUM of Square indicates that the model is stable over time within the reviewed period from 1990 – 2025.

The research's objective was to examine food security and Nigeria's economic development, for a 39 year

The following findings of the study was summarized below

Food security proxies as an indicator for food security all had a positive and significant relationship with economic development in Nigeria [17].

This means that economic development will strive well in Nigeria if proper attention is given to the economy.

Proper investment into the agriculture will boost the economy in terms of food supply, earnings and employment generation and decrease over dependence and importation.

Exportation or exportation will be encouraged as enough ids produced.

5. Conclusions

The study examines food security and economic development in Nigeria and to this effect, time series data for 45 years (1980-2025) was employed from CBN bulletin . Macroeconomic variables such as; per capita income (endogenous variable) and food security index proxies such as dietary energy supply, food accessibility, food availability, food utilization, food utilization and food stability was used as the exogenous variables. All the independent variables had positive and significant long- run relationship with economic development. This is because food production index is expected to increase economic development of the economy, reduce the importation of staple foods, and increase a Nations foreign earning. Nigeria however is still a net importer of food even if the relationship is positive with economic development in Nigeria. The more an economy expend on food importation, the lesser it is able to channel her resources into other developmental projects, thus the bulk of her income is expended in importing food, denoting a sign that the country still

experiences food insecurity. The study concludes that food security significantly impact on Nigeria's economic development.

The findings from this study raise the following policy issues and recommendations;

Nigeria should reduce her food import bill, as that will afford her the opportunity to utilize her foreign reserve on more capital intensive imports.

The government should direct and prioritize the agricultural sector, as that will not just ensure it attains food security, but will increase employment, and income to the populace.

Revitalize the existing infrastructures such as agricultural based institutions for exportations of produced goods.

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