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Impact of agricultural financing on food security in Nigeria

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Abstract

This study examined the impact of agricultural financing on food security in Nigeria from 1990 to 2024 using an ex-post facto research design. Secondary data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin (2024) and the Food and Agriculture Organization (FAO) database. The Augmented Dickey-Fuller (ADF) unit root test was employed to determine the stationarity of the variables, while the Vector Autoregressive (VAR) model was used to analyze the dynamic relationship between agricultural financing and food security. The findings revealed that the Agricultural Credit Guarantee Scheme Fund (ACGSF) had a positive and statistically significant effect on food security in Nigeria. In contrast, Commercial Bank Credit to the Agricultural Sector (CBCA) and Agricultural Expenditure on Training (AET) exerted positive but statistically insignificant effects on food security during the study period. Overall, the results indicate that agricultural financing contributes positively to improving food security in Nigeria. The study concludes that strengthening agricultural financing mechanisms is essential for enhancing food security and sustainable agricultural development. It recommends that the Federal Government encourage commercial banks to expand credit to the agricultural sector through lower lending rates and accessible financing schemes. It also advocates increased awareness of available credit facilities, particularly for smallholder farmers, alongside the provision of an enabling environment through improved security, pest control measures, quality seedlings, and other agricultural support services to enhance productivity and food security.

Keywords: Agricultural Financing, Food Security, Calorie Intake, Sustainable Growth, Development.

Introduction

Food security is considered as a pivotal factor for sustainable development of every nation. It is of paramount importance for sustainability (Dehrashid,

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2021)[3]. Without a doubt, "food security" is essential to society`s safety (Ayunku, 2019)[4]. According to Arounaet (2017)[5] reducing food insecurity and poverty continuous to be at lead of all sustainable development goals (SDGs), with many development projects aimed towards achieving these goals in sub-Saharan Africa.

Globally, about **768 million** people were undernourished in **2021** (ZEF & FAO, 2022)[6]. In Africa, approximately **278 million** people suffered from undernourishment in **2022**, representing **20.2%** of the population, up from **17.6%** in **2014**. This rate is more than double the global average of **9.1%** (ZEF & FAO, 2022)[7]. Rising population, dependence on food imports, declining agricultural output, and conflicts continue to threaten food security in Sub-Saharan Africa (Van Ittersum, 2016)[8].

Despite global efforts to achieve **SDG 2** by **2030**, hunger and food insecurity increased following the **COVID-19** pandemic, reflecting widening inequalities and uneven economic recovery (World Food Program, 2022; FAO, 2022)[9]. International Fund for Agricultural Development (2013)[10] emphasized the strong link between agriculture, nutrition, and food security, while FAO (2013)[11], Garrett (2017)[12], and Saheed (2018)[13] noted that integrating nutrition into agricultural development is essential, although agricultural expenditure alone cannot guarantee food security.

Agriculture remains the sector with the greatest potential for pro-poor growth in Nigeria. Public expenditure on agriculture is essential for transforming the sector, particularly given the low level of private investment despite its significant capacity for wealth creation, employment generation, poverty reduction, and food security (Anyanwu, 2018). Most of Nigeria's agricultural labour force is engaged in subsistence farming rather than commercial agriculture, limiting productivity and food security. Agriculture also serves as the primary source of livelihood for the rural population, yet households dependent on it experience relatively high levels of food insecurity (FAO,

[3]Dehrashid, S. A. Food security and sustainable development. *Journal of Sustainable Development*, 14(2), 112-128. (2021).
[4]Ayunku, P. E. (2019). Food security and societal safety in developing nations. *International Journal of Food Security*, 7(3), 89-102.
[5]Arounaet, A. Reducing food insecurity and poverty in sub-Saharan Africa. *Food Policy*, 68, 45-56. (2017).
[6] ZEF & FAO. Global hunger and food insecurity statistics. ZEF/FAO. (2022).
[7] Ibid
[8] Van Ittersum, M. K. Food security in sub-Saharan Africa: Challenges and opportunities. *Global Food Security*, 9, 45-58. (2016).
[9] World Food Program. Achieving SDG 2: Ending hunger and food insecurity. WFP. (2022).
[10] International Fund for Agricultural Development. (2013). Agriculture, nutrition and food security linkages. IFAD.
[11] Food and Agricultural Organization. (2013). Agricultural development projects and best practices. FAO.
[12]Gemmell, N. The growth of the public sector: Theories and international evidence. Edward Elgar. (1993).
[13]Saheed, Z. Agricultural expenditure and food security in Nigeria. *Journal of African Economics*, 23(4), 567-584. (2014).

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2020)[14]. Consequently, increased public investment is vital to improving agricultural productivity and rural welfare.

Effective allocation of resources to agricultural services including extension, credit, research and development (R&D), and plant and livestock disease control is critical to enhancing sectoral performance (World Bank, 2021)[15]. Improved agricultural productivity strengthens food security, enhances nutrition and health, increases labour productivity, and reduces dependence on imported food, thereby conserving foreign exchange (Saheed, 2004)[16]. According to Saheed (2014)[17], strategic agricultural expenditure promotes food production, improves nutrition, stimulates economic growth, and strengthens national food security. Recognizing these benefits, the Nigerian government has implemented several agricultural policies and programmes aimed at achieving self-sufficiency in food production and ensuring food security, although some initiatives have been restructured or discontinued. In line with the Sustainable Development Goals (SDGs), particularly the goal of ending hunger, government expenditure on agriculture has continued to increase to strengthen the country's food security and agricultural development (Davies, 2009)[18].

To improve food security and reduce hunger, Nigeria has implemented several agricultural initiatives, including the Special Programme for Food Security (SPFS, 2004)[19], FADAMA Development Project (1990), and Community-Based Agricultural and Rural Development Scheme (CA & RDS, 2001)[20] (Bello, 2004)[21]. More recent interventions, such as the National Food Security Council, Agricultural Transformation Agenda, Anchor Borrowers' Programme, Green Alternative, and School Feeding Programme, demonstrate renewed government commitment to agriculture, food security, poverty reduction, and economic development (Davies, 2020)[22].

Despite these initiatives, Business Day (2024)[23] reported that agricultural budgetary allocation remained below 2% of the national budget between 2017 and 2023, ranging from 1.11% to 2%. Although the UN (2021)[24] reported improvements in food security globally, Nigeria continues to face worsening

[14] Food and Agricultural Organization. (2020). Agriculture and rural livelihoods in Nigeria. FAO.
[15]World Bank. (2021). World development report: Agriculture and development. World Bank.
[16]Saheed, Z. (2014). Agricultural expenditure and food security in Nigeria. *Journal of African Economics*, 23(4), 567-584.
[17]Ibid
[18]Davies, A. E. (2009). Public expenditure on agriculture and food security in Nigeria. *Journal of Development Studies*, 45(6), 890-907.
[19] SPFS, 2004
[20] CA & RDS, 2001
[21]Bello, A. (2004). Agricultural policies and food security in Nigeria. *Nigerian Journal of Agricultural Policy*, 2(1), 34-48.
[22]Davies, A. E. (2020). Agricultural policies and programs in Nigeria: A review. *Nigerian Journal of Agricultural Economics*, 10(2), 56-73.
[23]Business Day Newspaper. (2024). Budgetary allocation to agriculture sector in Nigeria. *Business Day*, January 15, 2024.
[24]United Nations. (2021). Sustainable Development Goals report 2021. United Nations.

food insecurity due to drought, flooding, and conflicts. UNICEF (2022)[25] estimated that 17 million Nigerians were food insecure, including 3 million in the BAY states, with the figure projected to rise to 4.4 million during the lean season. These challenges underscore the need to examine the impact of public agricultural expenditure on food security in Nigeria.

Agricultural financing policies in Nigeria aim to create sustainable financing systems, institutions, and programs that provide credit to small, medium, and large-scale farmers, processors, and marketers. Effective agricultural financing strengthens food security, creates employment, supplies raw materials for industries, and supports balance of payments stability through increased exports. Sustained agricultural growth also contributes to poverty and hunger reduction by improving food availability and stabilizing prices. Furthermore, it promotes industrial development through a steady supply of raw materials, enhances production capacity, releases labour for other productive sectors, and supports overall economic growth and national development.

The poor performance of Nigeria's agricultural sector prompted the Central Bank of Nigeria (CBN) to establish the Nigeria Incentive-Based Risk Management System for Agricultural Lending in 2011. NIRSAL was designed to strengthen both the agricultural value chain and agricultural financing by addressing challenges such as low productivity, inadequate technology, poor farming practices, limited research and development, and insufficient funding. With agriculture receiving only about 2% of total bank lending at the time, the initiative proposed a USD 500 million investment to improve the value chain and encourage increased bank lending through incentives and technical support.

Nigeria's agricultural financing has been supported through several government initiatives over the past four decades. Major schemes include the Agricultural Credit Guarantee Scheme Fund (ACGSF, 1977), the Nigerian Agricultural, Cooperative and Rural Development Bank (NACRDB, 1973), now the Bank of Agriculture (BOA), and the Commercial Agricultural Credit Scheme (CACS, 2009), which collectively invested billions of naira in the agricultural sector over about 40 years. Additional support came from the World Bank-assisted Agricultural Development Programmes (ADPs), state agricultural credit programmes, and social intervention initiatives such as Operation Feed the Nation (OFN), Green Revolution (GR) otherwise known as 'Back to Land', Directorate for Food, Roads, and Rural Infrastructure (DFRRI), Directorate of Employment, Better life Programme for Rural Women, National Economic Empowerment and Development Strategy (NEEDS), SURE-P, YOU WIN, and National Poverty Eradication Programme (NAPEP).

STATEMENT OF THE PROBLEM

All these policies and programmes are aimed at ensuring adequate funding of the priority sectors of the economy especially the agricultural sector to improve

[25]United Nations Children's Fund. (2022). Food insecurity and children in Nigeria. UNICEF.

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output, ensure food security and reduce poverty. Despite the policies and Programmes, agricultural sector seems not have fared well in Nigeria thereby leaving the agricultural sector perpetually at the subsistence level. Also not much seems to have been achieved through schemes (CBN, 2011)[26]. These peasant farmers rely essentially on the informal financial institutions in their areas. Konare (2001)[27] endorsed that the issue of inadequate access to credit by rural farmers, among others, has remained the central concern for farmers, and a key constraint to the modernization and diversification of their activities. In as much as getting start-up capital is difficult; the financial institutions in Nigeria are always reluctant to finance Agribusiness projects despite the fact that there is always a ready market for Agricultural produce.

Objective of the study

The main objective of the study is to investigate the impact of agricultural financing on food security in Nigeria from 1990 to 2024,the study specific objectives are to:

a) Examine the impact of agricultural credit guarantee scheme on food security in Nigeria.
b) Evaluate the impact of commercial banks credit to agricultural sector on food security in Nigeria.
c) Determine the impact of agricultural training expenditure on food security in Nigeria.

Literature review

Conceptual Review

Agriculture

Akinboyo (2008)[28] defines agriculture as the science of utilizing land to cultivate crops and rear animals for human use. It simplifies natural food systems to enhance food and animal production. According to Ogen (2007)[29], agriculture was Nigeria's leading economic sector in the 1960s, contributing significantly to GDP and serving as the engine of economic growth, similar to Brazil during the post-independence period. Agriculture remains the major source of livelihood for most Nigerian households and an important sector of the economy.

Agricultural Financing

Obansa and Maduekewe (2013)[30] describe agricultural financing as long-term financing aimed at promoting agriculture-led economic growth and development. It encompasses financial services supporting production, input

[26]Central Bank of Nigeria. Nigerian Incentive-Based Risk Management System for Agricultural Lending (NIRSAL). CBN Publication. (2011).
[27]Konare, A. Access to credit for rural farmers in developing nations. *African Journal of Agricultural Research*, 2(3), 156-172. (2001).
[28]Akinboyo, O. O. (2008). Agricultural science and the Nigerian economy. University Press.
[29]Ogen, O. (2007). Agriculture in the Nigerian economy: Historical perspectives. *African Journal of History and Culture*, 3(2), 45-62.
[30]Obansa, S. A. J., &Maduekeve, I. N. (2013). Agricultural financing in Nigeria: Challenges and prospects. *Nigerian Journal of Agricultural Research*, 8(3), 134-151.

supply, processing, storage, distribution, and marketing. In developing countries, inadequate access to finance remains a major constraint to agricultural development.

Agricultural finance comprises government and private funds provided through loans, grants, or equity to improve agricultural productivity and socio-economic welfare (Shreiner & Yaron, 2001)[31]. Adejumo and Bolarinwa (2017)[32] argue that government financing programmes improve farmers' access to credit, modern technologies, quality inputs, and financial protection against crop losses caused by pests, diseases, or natural disasters. The Central Bank of Nigeria (CBN), in collaboration with the World Bank, has continued to promote agricultural financing to increase GDP contribution and employment.

Chen (2018)[33] defines agricultural credit as financing provided through loans, letters of credit, and bankers' acceptances for agricultural production, storage, and distribution. Such credit enables farmers to acquire improved seeds, fertilizers, pesticides, machinery, livestock feed, and irrigation facilities, thereby enhancing productivity.

Agricultural financing consists of debt and non-debt sources. Thirlwall (1976)[34] explains that debt financing involves contractual repayment obligations, while Ariyo (1999)[35] notes that debt sustainability depends on a nation's capacity to service its obligations. Non-debt financing imposes no compulsory repayment burden. Long-term agricultural finance includes foreign direct investment, portfolio investment, official development assistance, and foreign loans, while public funds are often subsidized unlike private finance (Shreniner&Yaron, 2001)[36].

Agricultural Financing Policies in Nigeria

Since the 1970s, successive Nigerian governments have introduced policies aimed at revitalizing agriculture, improving food self-sufficiency, and expanding farmers' access to credit. These policies were designed to promote sustainable agricultural growth and improve the welfare of Nigerians. According to the Central Bank of Nigeria (2007)[37], agricultural financing policies seek to establish sustainable credit systems that provide macro- and micro-credit facilities for small-, medium-, and large-scale agricultural producers.

[31]Schreiner, M., &Yaron, J. (2001). Development finance institutions: A review. World Bank.
[32]Adejumo, A. O., &Bolarinwa, S. A. (2017). Agricultural financing programs and farmers' access to credit in Nigeria. *Journal of Agricultural Science and Technology*, 19(4), 789-801.
[33]Chen, J. Agricultural credit and its importance in developing countries. *International Journal of Agricultural Finance*, 9(2), 78-95. (2018).
[34]Thirlwall, A. PDebt financing and economic growth. *Economic Journal*, 86(344), 789-806. . (1976).
[35]Ariyo, A. Debt financing and economic development in Nigeria. *Nigerian Journal of Economic and Social Studies*, 41(2), 123-145. (1999).
[36]Schreiner, M., &Yaron, J. Development finance institutions: A review. World Bank. (2001).
[37]Central Bank of Nigeria. Agricultural financing initiatives and policies in Nigeria. CBN Publication. (2007).

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Government initiatives have focused on restoring agriculture and addressing inadequate access to finance.

Nzota and Okereke (2009)[38] observed that agricultural policies significantly influenced financial deepening and agricultural development, while Akiri and Adufu (2007)[39] argued that Nigeria's financial system supports agricultural growth through financial intermediation. However, the Central Bank of Nigeria (2007)[40] identified major constraints to policy success, including commercial banks' reluctance to finance agriculture, inadequate technical capacity, poor farm management, and limited loanable funds.

Food Security

Nasrollahizadeh (2021)[41] defines food security as a situation in which people have continuous access to adequate and nutritious food. Similarly, Key (2021)[42] views it as the constant availability of sufficient food supplies. The concept was formally introduced at the World Food Summit in 1974 as the availability of adequate food supplies to sustain consumption and reduce fluctuations in production and prices (United Nations, 1975)[43]. The Food and Agriculture Organization expanded the definition to include physical and economic access to sufficient, safe, and nutritious food for all people at all times (FAO, 2018; Food and Agricultural Organization, 2019)[44].

By the mid-1990s, food security had evolved beyond food availability to include nutrition, food safety, dietary quality, and food preferences. Consequently, food security is now understood as ensuring that all people have physical, social, and economic access to safe, nutritious, and culturally acceptable food required for an active and healthy life (FAO, 2002)[45].

Theoretical Review

Several theories are relevant to studying impact of agricultural financing on food security in Nigeria, as they provide foundational frameworks for understanding how agricultural financing, influence food security.

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[38]Nzota, J. O., &Okereke, E. E. Agricultural policies and financial deepening in Nigeria. *Journal of Banking and Financial Services*, 5(2), 89-104. (2009).
[39]Akiri, S. E., &Adufu, A. F. Financial system and agricultural growth in Nigeria. *Journal of Banking and Finance*, 3(2), 67-82. (2007).
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[41]Nasrollahizadeh, A. Food security and access to adequate nutrition. *Journal of Food Policy*, 45(2), 78-95. (2021).
[42]Key, M. (2021). Defining food security in the 21st century. *Global Food Security*, 28, 100-112.
[43]United Nations. (1975). Report of the World Food Conference. United Nations.
[44]Food and Agricultural Organization. Food security and nutrition: Concepts and definitions. FAO. (2018).
Food and Agricultural Organization. Food security: An expanded concept. FAO. (2019).
[45] Food and Agricultural Organization. The state of food insecurity in the world 2002. FAO. (2002).

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Keynesian Theory of Expenditure

Following the Great Depression after the First World War, John Maynard Keynes argued in his **1936** book, *The General Theory of Employment, Interest and Money*, that market forces alone could not achieve full employment. He advocated government intervention through fiscal policy and budgetary expansion to stimulate aggregate demand, increase production, employment, income, and Gross Domestic Product (GDP). According to Keynes, higher government expenditure encourages firms to expand production and employ more workers.

A major limitation of the theory, according to Muthui, J. N., Kosimbei, G., Maingi, J., &Thuku, G. K. **(2013)**[46], is that increased government spending may generate inflation, persistent budget deficits, and rising public debt. Critics also argue that such policies weaken fiscal discipline through large government budgets, deficit financing, and increased taxation, creating long-term economic challenges.

Rostow-Musgrave Theory of Public Expenditure

The Rostow-Musgrave theory explains the role of public expenditure in economic development. Rostow presented a stage-of-growth theory, while Musgrave emphasized public expenditure as a tool for industrialization and development. According to the theory, government should invest heavily in social overhead capital such as roads, bridges, ports, transport, communication, health, and education during the early stages of development to address market failures. Musgrave argued that as the economy grows and investment increases, the share of public sector investment declines, while Rostow maintained that mature economies shift public expenditure from infrastructure to education, health, and welfare.

Muthui et al. (2013)[47] criticized the theory for overlooking the role of the private sector in economic development. Similarly, Hilsenrth (1993)[48] argued that growth depends on broader factors, including technology, policies, regulations, and societal attitudes. Cairncross (1961)[49] questioned Rostow's "take-off" stage, emphasizing that economic development is a gradual rather than abrupt process. Likewise, Stabile (2014)[50] criticized the assumption that

[46]Muthui, J. N., Kosimbei, G., Maingi, J., &Thuku, G. K. Keynesian theory and public expenditure in developing economies. *International Journal of Economics and Finance*, 5(6), 45-62. (2013).
[47]Muthui, J. N., Kosimbei, G., Maingi, J., &Thuku, G. K. Keynesian theory and public expenditure in
developing economies. *International Journal of Economics and Finance*, 5(6), 45-62. (2013).
[48]Hilsenrath, P. Rostow's theory applied to developing countries. *Journal of Development Economics*, 41(2),
289-305. (1993).
[49]Cairncross, A. K. Introduction to economics (5th ed.). Butterworths. (1961).
[50]Stabile, M. Critics of Wagner's law and its applicability. *Journal of Public Finance*, 39(2), 145-162. (2014).

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all countries follow the same development path, noting that differences in economic, political, social, and cultural conditions shape public expenditure and development outcomes.

Wagner's Theory of Increasing State Activities

Adolf Wagner **(**1835–1917**),** a German economist, developed the **Law of** Increasing State Activities based on Germany's historical experience. The law states that as per capita income increases, public expenditure also rises because economic growth, urbanization, and population expansion create greater demand for government services such as security, law enforcement, infrastructure, education, and social welfare (Jaen-Garcia, 2018)[51]. Although well known in Germany, Wagner's work gained wider recognition after its inclusion in *Classics in the Theory of Public Finance* **(**1958**)** by Musgrave and Peacock.

Wagner identified three reasons for increasing state participation: the growing complexity of economic and legal systems, rising demand for public services such as education and income redistribution, and government intervention to regulate or replace private monopolies. Tim (1961)[52], Peacock and Wiseman (1961)[53], Goffman (1968)[54], and Bird (1971)[55] interpreted the law as implying that rising national income leads to an expansion of public expenditure relative to the economy.

Eckhard (2002)[56] highlighted several limitations of Wagner's law. First, it was developed from **19th-century Germany**, making its application to other economies difficult because of differences in industrialization, institutions, and democratization (Bird, 1971; Gemmell, 1993)[57]. Second, the theory reflects Wagner's normative assumptions about economic development rather than a purely positive explanation (Seeber&Dockel, 1978; Bird, 1971)[58]. Third, it

[51]Jaen-Garcia, M. Wagner's law and public expenditure growth. *International Journal of Public*
Administration, 41(5), 389-402. (2018).
[52]Tim, M. Public expenditure trends and Wagner's law. *American Economic Review*, 51(3), 456-472. (1961).
[53]Peacock, A. T., & Wiseman, J. The growth of public expenditure in the United Kingdom. University Press.
(1961).
[54]Goffman, I. J. On the empirical testing of Wagner's law. Public Finance, 23(3), 345-358. (1968).
[55]Bird, R. M. Wagner's law of expanding state activity. *Public Finance*, 26(1), 1-26. (1971).
[56]Eckhard, J. Limitations of Wagner's law in economic analysis. *European Journal of Political Economy*, 18(3), 567-582. (2002).
[57]Bird, R. M. Wagner's law of expanding state activity. *Public Finance*, 26(1), 1-26. (1971).
Gemmell, N. (1993). The growth of the public sector: Theories and international evidence. Edward Elgar.
[58]Seeber, M., &Dockel, J. Wagner's law in historical perspective. *South African Journal of Economics*, 46(4), 345-362. (1978).
Bird, R. M. Wagner's law of expanding state activity. *Public Finance*, 26(1), 1-26. (1971).

ignored the impact of wars on public expenditure, an omission later criticized by Gemmell (1993)[59] and Bird (1971)[60].

This study adopts Wagner's Theory of Increasing State Activities because it explains how rising government expenditure accompanies economic growth and expanding public sector responsibilities.

Empirical Review

There exists a large body of both theoretical and empirical literatures focusing on the impact of agricultural financing on food security in Nigeria. Mbelu and Ifionu (2022)[61] investigated the influence of agricultural financing on Nigeria's economic growth from **1981–2019** using the Augmented Dickey-Fuller test, cointegration, Error Correction Model (ECM), and Granger causality techniques. The findings revealed a long-run positive and significant relationship between Agricultural Credit Guarantee Scheme Funds, commercial bank loans, community microfinance bank loans, and GDP. The study concluded that agricultural financing significantly promotes economic growth and recommended increased access to affordable agricultural credit, lower lending rates, and improved government support through security, quality seedlings, and pest control.

Similarly, Afolabi, Ayodele, Daramola, and Adewumi (2022)[62] examined the relationship between agricultural financing and food security in Nigeria using time-series data and the Autoregressive Distributed Lag (ARDL) model. The study found that adequate agricultural financing significantly enhanced agricultural output and economic growth. It recommended improved transparency, good governance, and stronger coordination among government, financial institutions, and development partners to enhance farmers' access to finance.

Kareem, Arije, Amo, and Avovome (2022)[63] examined the impact of federal government agricultural financing on food security in Nigeria using time-series data from the Central Bank of Nigeria (CBN). Applying the Augmented Dickey-Fuller (ADF) test, cointegration, and Vector Autoregressive (VAR) model, the study found that federal government agricultural financing had a negative but insignificant effect on economic growth, while the Agricultural Credit Guarantee Scheme Fund (ACGSF) had a positive but insignificant effect. The study recommended increased government funding for agricultural sector.

[59]Gemmell, N. The growth of the public sector: Theories and international evidence. Edward Elgar. (1993).
[60]Bird, R. M. Wagner's law of expanding state activity. *Public Finance*, 26(1), 1-26. (1971).
[61]Mbelu, O. C., &Ifionu, E. P. Agricultural financing and economic growth in Nigeria. *Journal of Economics and Finance*, 13(4), 78-95. (2022).
[62]Afolabi, J. A., Ayodele, O. S., Daramola, O. F., &Adewumi, O. A. Agricultural financing and food security in Nigeria. *Nigerian Journal of Agricultural Economics*, 12(1), 34-47. . (2022).
[63]Kareem, R. O., Arije, O. O., Amo, O. S., &Avovome, A. A. Federal government agricultural financing and food security in Nigeria. *Journal of Agricultural Extension*, 26(2), 45-58. (2022).

Odili (2022)[64] investigated the effects of agricultural financing on agricultural productivity in Nigeria using data from **1981–2018** obtained from the CBN, National Bureau of Statistics (NBS), and IMF. Employing the Johansen cointegration test and Vector Error Correction Model (VECM), the study found that ACGSF positively and significantly affected agricultural output, whereas commercial bank credit, government expenditure, and interest rates had significant negative effects. The study recommended increased investment, improved credit monitoring, irrigation facilities, and inclusive agricultural financing policies.

Abdulrafiu and Dabo (2022)[65] analyzed the impact of agricultural finance on agricultural output in Nigeria using annual data from **1983 - 2018**.Using the VAR and Granger causality techniques, the study revealed that government agricultural financing and commercial bank credit had significant positive long-run effects on agricultural output. It recommended increased agricultural financing and lower-interest loans to enhance sectoral productivity.

Mosinmileoluwa, Ochei, Godswill, and Grace (2021)[66] examined the influence of agricultural credit on Nigeria's economic growth between **1981 and 2017** using the Autoregressive Distributed Lag (ARDL) model. The findings showed that deposit money bank credit significantly promoted economic growth in the long run, while ACGSF was statistically insignificant. The study recommended improved access to agricultural credit and timely disbursement of financial assistance to farmers.

The reviewed studies indicate that agricultural financing generally enhances agricultural output and economic growth, although findings vary depending on financing sources and estimation techniques. Methodologically, most studies employed ARDL, TAR, NARDL, VECM, and VAR models, with limited application of VAR to food security analysis. In addition, existing studies largely covered periods ending between **2017 and 2022**. This study addresses these methodological and time gaps by employing the VAR approach and extending the analysis to **2024** to capture recent agricultural sector reforms in Nigeria.

Methodology

This study adopts a quantitative ex-post facto research design using annual time-series data obtained from the Central Bank of Nigeria (CBN)publications. To examine the impact of agricultural financing on food security, the study employs the Vector Autoregressive (VAR) model**,** which captures the dynamic relationships among variables by treating all variables as endogenous without imposing prior structural restrictions (Nwaobi, 2012)[67]. The VAR model is appropriate because it effectively analyzes both short-run and long-run

[64]Odili, O. Agricultural sector funding and productivity in Nigeria. *Journal of Agricultural and Environmental Studies*, 9(4), 112-135. (2022).
[65]Abdulrafiu, T. A., &Dabo, Z. Impact of agricultural finance on agricultural output in Nigeria. *International Journal of Finance and Accounting*, 7(2), 45-62. (2022).
[66]Mosinnileoluwa, O. A., OcheiGodswill, C., & Grace, O. Agricultural credit and economic growth in Nigeria*. Nigerian Journal of Economic Policy*, 8(3), 67-84. (2021).
[67]Nwaobi, G. Vector autoregressive models in economic analysis. University Press. (2012).

interactions, allows estimation using Ordinary Least Squares (OLS), and facilitates policy analysis through Impulse Response Functions (IRF)**and**Forecast Error Variance Decomposition (FEVD)**.** The model specification follows Achumu, Ucheoma, Chinedu, and Chekwa (2022)[68], who applied the VAR framework to examine the effects of agricultural financing on agricultural output in Nigeria.

The VAR model is specified as follows;

$X_t = \sum_{i=1}^{n} \beta_i X_{t-i} + \mu_t$ ..... (1)

In this study, equation 1 was modified to suit this study to have the following functional equation:

AGO= f (ACGS, CBCA, GEXA, AET, INTRA)..... (2)

Where;

AGO	=	Agricultural Output
ACGSF	=	Agricultural Credit Guarantee Scheme Fund
CBCA	=	Commercial Bank Credit to Agricultural Sector
AET	=	Agriculture Training Expenditure
β_i toβ_n	=	the coefficients
μ_t	=	vector of error terms.

The model has been explicitly stated below with 4×4 vector variables matrices.

$CAI_t = \alpha_{10} + \sum_{i=1}^{n} \alpha_{11i} GCAI + \sum_{i=1}^{n} \alpha_{12i} ACGSF_{t-i} + \sum_{i=1}^{n} \alpha_{13i} CBCA_{t-i} +$

$\sum_{i=1}^{n} \alpha_{14i} AET_{t-i} + \mu_{1t}$ ..... (3)

$ACGSF_t = \alpha_{20} + \sum_{i=1}^{n} \alpha_{21i} CAI_{t-i} + \sum_{i=1}^{n} \alpha_{22i} ACGSF_{t-i} +$

$\sum_{i=1}^{n} \alpha_{23i} CBCA_{t-i} + \sum_{i=1}^{n} \alpha_{24i} AET_{t-i} - + \mu_{2t}$...(4)

$CBCA_t = \alpha_{30} + \sum_{i=1}^{n} \alpha_{31i} CAI_{t-i} + \sum_{i=1}^{n} \alpha_{32i} ACGSF_{t-i} + \sum_{i=1}^{n} \alpha_{33i} CBCA_{t-i} -$

$\sum_{i=1}^{n} \alpha_{34i} AET_{t-i} - + \mu_{3t}$..... (5)

$AET_t = \alpha_{40} + \sum_{i=1}^{n} \alpha_{41i} CAI_{t-i} + \sum_{i=1}^{n} \alpha_{42i} ACGSF + \sum_{i=1}^{n} \alpha_{43i} CBCA_{t-i} -$

$\sum_{i=1}^{n} \alpha_{44i} AET_{t-i} - + \mu_{4t}$ ..... (6)

A priori $\alpha_{11}, \alpha_{12}, \alpha_{13} \geq 0$;

In line with economic theory, it is expected that Agricultural Credit Guarantee Scheme Fund (ACGS), commercial bank credit to agricultural sector (CBCA), Agriculture Training Expenditure (AET), Agriculture Training Expenditure (AET) are expected to have positive relationship with food security (CAI) in Nigeria.

[68]Achumu, U., Ucheoma, C., Chinedu, N., & Chekwa, V. Effects of agricultural financing on food security in Nigeria: A Bayesian VAR approach. *Journal of Agricultural Economics and Development*, 11(3), 112-128. (2022).

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Nature and sources of data

The study used secondary data published by the National Bureau of Statistic (NBS). The annual time series data is with respect to calorie intake, Agricultural Credit Guarantee Scheme Fund (ACGS), commercial bank credit to agricultural sector (CBCA), Agriculture Training Expenditure (AET), Agriculture Training Expenditure (AET) and interest rate to Agricultural Loan; will be obtaining from the National Bureau of Statistic (NBS) statistical bulletin.

Data presentation and analysis

Descriptive Statistics Analysis Results
Presented in table 1 below is the result of descriptive statistics analyses carried out on the study variables (CAI, AGCSF, CBCA and AET).

Table 1: Descriptive Statistics Analysis Result

	CAI	AGCSF	CBCA	AET
Mean	52971.46	5355849.	202880.8	291.5564
Median	30375.18	4425462.	67738.60	262.2100
Maximum	210445.1	12740497	599855.8	994.1900
Minimum	494.6400	80859.60	4221.400	2.340000
Std. Dev.	58962.21	4962663.	216494.4	234.5426
Skewness	1.064912	0.190880	0.759533	1.002428
Kurtosis	3.105398	1.343124	1.921075	3.921566
Jarque-Bera	6.252479	3.975098	4.773504	6.694509
Probability	0.043883	0.137031	0.091928	0.035181
Sum	1748058.	1.77E+08	6695067.	9621.360
Sum Sq. Dev.	1.11E+11	7.88E+14	1.50E+12	1760327.
Observations	35	35	35	35

Source: Author's Computation 2025, using E-view 12.0 version

Results in table 1 above shows that all the variables have distributions that are positively skewed (having skewness or asymmetry or tapering) in nominal values (having positive signs). All the variables (CAI, AGCSF, CBCA, and AET) are also skewed to the right by having means which are greater than their medians in terms of nominal values except CBCA variable whose mean is less than its median. All the variables are having positive maximum and minimum values. In terms of kurtosis (Peakedness or pointedness), all the variables have acceptable distribution values that are less than +2 except CAI and AET. On the Jaque-Bera, the variable residuals appeared to be normally distributed by having probability values which are greater than 0.05 (5%) except CAI AND AET.

4.3 Pre-estimation Tests Results
Presented below are results of pre-estimation tests carried out.

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Table 2*:* Augmented Dickey-Fuller (ADF) Test Results

Series	Unit Root at Level					Unit Root at First Difference				
	Critical T-Statistics	ADF T-Statistics	P-Values	Order of Integration	Remarks	Critical T-Statistics	ADF T-Statistics	P-Values	Order of Integration	Remarks
CAI	-2.957110	9.920828	1.0000	I(0)	Accept H_0	-2.981038	-3.893513	0.0065	I(1)	Reject H_0
AGCSF	-2.967767	-0.031918	0.9479	I(0)	Accept H_0	-2.967767	-4.922750	0.0004	I(1)	Reject H_0
CBCA	-2.981038	0.587622	0.9865	I(0)	AcceptH_0	-3.622033	-4.070694	0.0000	I(1)	Reject H_0
AET	-2.991878	-0.611706	0.8503	I(0)	Accept H_0	-2.998064	-5.011453	0.0006	I(1)	Reject H_0

Source: Author's Computation 2025, using E-view 12.0 version
NOTE: Test was conducted at 5% Level of Significance

The unit root test results in table 2 above shows that all the variables (CAI, AGCSF, CBCA, and AET) when tested at level or I(0), have unit root or are not stationary. This is evident by their having p-values which are greater than 0.05 level of significance that is otherwise. However, when the variables where tested at first difference or I(1), they (CAI, AGCSF, CBCA, and AET) all have no unit roots or became stationary. This is evident by their having p-values which are less than 0.05 levels of significance. In general, the unit root test results shows that the variables under study have a stochastic trend and are good for inclusion in the chosen model for their parameter estimation. This shows that the variables have trend order of integration, which makes it suitable for the application of VAR model.

Johansen Co-integration Test Result
Presented in table 3 below is the result of the Johansen Cointegration Test Result
Table 3: Johansen co-integration test result

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.828719	87.42147	47.85613	0.0000
At most 1 *	0.489020	36.25240	29.79707	0.0078
At most 2 *	0.373152	16.78105	15.49471	0.0319
At most 3	0.105604	3.236587	3.841465	0.0720

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
Source: Author's Computation 2025, using E-view 12.0 version

An examination of table 3 showed that the Eigen value statistics shows existence of three unique co-integrating equations between the variables; CAI, AGCSF, CBCA and AET at 5 percent level. Thus, it can be concluded that there is long-run relationship between Agricultural Financing and economic growth in Nigeria during the 1990-2024. Since there is at least three co-integrating equation found in the model, the study concludes that significant long-run relationship exists among the variables. Also, since all the variables were found

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to be stationary and co-integrated, the study can now perform Vector Autoregressive model (VAR) test.

VAR Lag Order Selection Criteria

The study determines the optimal lag that can produce robust results. E-views uses the AIC, SC and HQ criteria to suggest the optimal lag length for that particular VAR.

Table 4: VAR Lag Order Selection Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-115.7024	NA	0.026551	7.722733	7.907763	7.783048
1	4.010809	200.8092*	3.33e-05*	1.031561*	1.956714*	1.333138*
2	16.89148	18.28224	4.32e-05	1.232808	2.898083	1.775646

* indicates lag order selected by the criterion
Source: Author's Computation 2025, using E-view 12.0 version

LR: Sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The results presented in Table 4 show that lag one (1) is the optimal lag because it has the least AIC, SC and HQ relative to the other lags. Based on the selected criteria (AIC) for this study, it implies that lag one is the optimal lag from the result. This study considers the outcome of AIC for the selection of the optimal model since it is an impact analysis.

VAR Regression Results

Presented in table 5 below are results of the VAR estimation of the variable's coefficients.

Table 5: VAR Regression Results

Table 5: VAR Regression Results

Vector Auto regression Estimates				
	LCAI	LAGCSF	LCBCA	LAET
LCAI(-1)	0.985461	0.342702	0.833936	0.516480
	(0.09556)	(0.36311)	(0.25254)	(0.62125)
	[10.3129]	[0.94380]	[3.30217]	[0.83136]
LAGCSF(-1)	0.002625	0.673370	-0.246504	-0.287540
	(0.04450)	(0.16908)	(0.11760)	(0.28928)
	[0.05899]	[3.98251]	[-2.09620]	[-0.99397]
LCBCA(-1)	-0.014396	-0.037831	0.360296	-0.061845
	(0.06407)	(0.24345)	(0.16932)	(0.41653)
	[-0.22471]	[-0.15539]	[2.12790]	[-0.14848]
LAET(-1)	-0.023901	0.013502	-0.111594	0.646322
	(0.02245)	(0.08530)	(0.05933)	(0.14595)
	[-1.06471]	[0.15828]	[-1.88094]	[4.42846]
C	0.577303	1.846647	3.351939	1.694072
	(0.34165)	(1.29824)	(0.90292)	(2.22117)

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	[1.68977]	[1.42242]	[3.71233]	[0.76269]
Co integrating Eq:	**LCAI(-1)**	**LAGCSF(-1)**	**LCBCA(-1)**	**LAET(-1)**
	1.000000	0.045004	-0.981334	-1.983327
		(0.48897)	(0.71598)	(0.46005)
		[0.09204]	[-1.37062]	[-4.31113]
Error Correction:	**D(LCAI)**	**D(LAGCSF)**	**D(LCBCA)**	**D(LAET)**
CointEq1	- 0.033754	-0.022510	0.012581	0.079889
	(0.00802)	(0.03611)	(0.02283)	(0.05558)
	[4.20836]	[-0.62332]	[0.55113]	[1.43745]
R-squared	0.997283	0.968175	0.973012	0.835297
Adj. R-squared	0.996880	0.963460	0.969014	0.810896
Sum sq. resids	0.243490	3.515918	1.700702	10.29186
S.E. equation	0.094964	0.360859	0.250976	0.617398
F-statistic	2477.614	205.3445	243.3616	34.23281
Log likelihood	32.64860	-10.07107	1.549086	-27.25591
Akaike AIC	-1.728037	0.941942	0.215682	2.015994
Schwarz SC	-1.499016	1.170963	0.444703	2.245016
Mean dependent	9.961529	14.49860	11.48155	5.177405
S.D. dependent	1.700261	1.887780	1.425766	1.419760
Determinant resid covariance (dof adj.)		2.34E-05		
Determinant resid covariance		1.19E-05		
Log likelihood		-0.166014		
Akaike information criterion		1.260376		
Schwarz criterion		2.176461		
Number of coefficients		20		

Source: Author's Computation 2025, using E-view 12.0 version

NOTE: Standard errors in ( ) & t-statistics in [ ]
The equation of the lower part of the table is a cointegrating equation and short run model and it is stated thus;

$$\mathbf{ECT_{t-1}} = Y_{t-1} - \eta_j X_{t-1} - \xi\, m\, R_{t-1} - \mu_t$$

$$\mathbf{ECT}\text{-}\ 0.033754_{\mathbf{t-1}} = 1.000DLCAI_{t-1} - 0.022510DLAGCSF_{t-1} + 0.012581DLCBCA_{t-1} + 0.079889DLAET_{t-1}$$

The economic theory are expressed and the sign of the co integrating parameter and its proper economic interpretation, thus a $CAI_t$to rise in periods t Gross Domestic Product coefficient sign will be thus 1% change in agricultural guarantee credit scheme fund will result to 2.2% decrease in CAI, a percentage change in commercial bank credit to agricultural sector will increase CAI by 1.2%. Finally, 1% change in agricultural training expenditure will result in 7.9% increase in CAI. The ECT results in the estimation demonstrate that the previous period departure from the long run deviation equilibrium is corrected in the present period as a 3.3% equivalent adjustment speed, which is quite slow.

The upper part of the table highlights the long run relationship. The regression equation as depicted thus;

$$LCAI_t = 0.577303\beta_{0t-1} + 0.985461LCAI_{t-1} + 0.342702LAGCSF_{t-1} + 0.833936LCBCA_{t-1} + 0.516480LAET_{t-1}$$

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The economic interpretations of the long run on the main variable thus as follow; for the gross domestic product lag (-1) shows that CAI exhibit strong endogenous which implies strong influence from own variable evidence from coefficient of CAI (0.985461).

$LAGCSF_t=1.846647\beta_{0t-1}$ $+0.002625LGDP_{t-1}$ $+0.673370LAGCSF_{t-1}$ $-0.246504LCBCA_{t-1}$ $-0.287540LAET_{t-1}$

The economic interpretations of the long run on the other variable (AGCSF) thus as follow; for the agricultural guarantee credit scheme fund lag (-1) shows that AGCSF exhibit strong endogenous which implies strong influence from own variable evidence from coefficient of AGCSF (0.673370). A percentage change in the agricultural guarantee credit scheme fund is associated with 0.2% increase in the lags of GDP on average ceterus paribus in the long run.

$LCBCA_t=3.351939\beta_{0t-1}$ $-0.014396LCAI_{t-1}$ $-0.037831LAGCSF_{t-1}$ $+0.360296LCBCA_{t-1}$ $-0.061845LAET_{t-1}$

The economic interpretations of the long run on the other variable (CBCA). The commercial bank credit to agricultural sector lag (-1) shows that CBCA exhibit strong endogenous which implies strong influence from own variable evidence from coefficient of CBCA (0.360296) while other variables exhibit strong exogenous evidence from their respective coefficients that are less than the coefficient of CBCA. A percentage change in the commercial bank credit to agricultural sector is associated with 1.4% decrease in the lags of GDP on average ceterus paribus in the long run.

$LAET_t=1.694072\beta_{0t-1}$ $-0.023901LCAI_{t-1}$ $+ 0.013502LAGCSF_{t-1}$ $-0.111594CBCA_{t-1}$ $+ 0.646322LAET_{t-1}$

The economic interpretations of the long run on the other variable (AET). The agricultural expenditure on training lag (-1) shows that AET exhibit strong endogenous which implies strong influence from own variable evidence from coefficient of AET (0.646322) while other variables exhibit strong exogenous evidence from their respective coefficients that are less than the coefficient of AET. A percentage change in the agricultural expenditure on training is associated with 2.3% decrease in the lags of GDP on average ceterus paribus in the long run.

The 0.997283 coefficient of multiple determinations (R^2) shows that up to 99% of the variations (changes) in the CAI were explained by the explanatory variables (AGCSF, CBCA, and AET). The remaining 1% variations are unexplained due to other factors, which are affecting GDP but not captured in the model or due to the error of measurement (U_i). This is a good fit of the model and shows that the data collected is suitable for agricultural financing analysis in Nigeria.

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Impulse Response Analysis of Economic Growth to Shocks in Agricultural Financing

Table 6: Impulse Response Results of CAI

Response of LCAI:

Period	LCAI	LAGCSF	LCBCA	LAET
1	0.094964	0.000000	0.000000	0.000000
	(0.01187)	(0.00000)	(0.00000)	(0.00000)
2	0.094493	-0.000961	-0.001992	-0.014380
	(0.01321)	(0.01513)	(0.01538)	(0.01363)
3	0.092456	0.001953	-0.002023	-0.022478
	(0.01433)	(0.02334)	(0.02131)	(0.02229)
4	0.089794	0.005631	-0.001663	-0.026828
	(0.01494)	(0.02871)	(0.02373)	(0.02809)
5	0.086895	0.008953	-0.001342	-0.028891
	(0.01530)	(0.03221)	(0.02469)	(0.03192)
6	0.083935	0.011579	-0.001134	-0.029562
	(0.01553)	(0.03428)	(0.02494)	(0.03430)

Cholesky Ordering: LCAI LAGCSF LCBCA LAET

Standard Errors: Analytic

Source: Author's Computation 2025, using E-view 12.0 version

From the impulse response of food security, proxied by (CAI) to shocks in agricultural financing in Nigeria in a 6-year forecast period, the result shows that food security would response positively and permanently to own shock. The study also found that food security would respond negatively to shock in AGCSF period (2), CBCA and AET periods (1-6) in Nigeria but food security would respond positively to shock in the AGCSF in periods (3-6). Shocks in AGCSF exert a temporary and initial negative effect on food security but reverts positive in the long-run. Shocks in CBCA and AET have negative influence initially on the level of food security and consistently negative in the long-run.

Variance Decomposition Analysis

The results of the accumulated forecast error variance of food security to shocks in agricultural financing in Nigeria are presented in Table 7.

Table 7: Accumulated Forecast Error Variance of food security to Shocks in agricultural financing

Variance Decomposition of LCAI:

Period	S.E.	LCAI	LAGCSF	LCBCA	LAET
Short-term	0.134754	98.83423	0.005083	0.021851	1.138834
Long-term	0.229257	93.52158	0.476928	0.026469	5.975027

Source: Author's Computation 2025, using E-view 12.0 version

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Analysis of the accumulated forecast error variance decomposition covers short term (second forecast period), and long term ((sixth forecast period)). From the VAR model, the result of the accumulated forecast error variance of food security to shock in agricultural guarantee credit scheme fund, commercial bank credit to agricultural sector, and agricultural expenditure on training account for 0.50%, 2.1%, and 113.8% of the accumulated forecast error variance of food security in the short-term period.

The accumulated forecast error variance of calorie intake to shock in agricultural guarantee credit scheme fund, commercial bank credit to agricultural sector, and agricultural expenditure on training account for 47.8%, 2.9%, and 597.55 of the accumulated forecast error variance of food security in the long-term period respectively. This implies that variance in food security due to utilization of adequate funding in agricultural guarantee credit scheme fund commercial bank credit to agricultural sector, and agricultural expenditure on training would increase overtime; however, agricultural expenditure on training would exert relatively higher variations in food security than the agricultural guarantee credit scheme fund and commercial bank credit to agricultural sector.

In terms of own shocks, the accumulated forecast error variance of food security to own shocks would account for 98.8% in the short-term, and 93.5% in the long-term period respectively. This implies that variance in food security would decline over time to own shock. The result further shows that majority of the variations in food security would be accounted by own shocks throughout the forecast period.

Post-Estimation Tests Results

Presented below are results of post-estimation test carried out:

Serial Correlation Test Result

Table 8: Serial correlation Result

VAR Residual Serial Correlation LM Tests						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	23.24459	16	0.1074	1.552585	(16, 61.7)	0.1104
2	12.09541	16	0.7374	0.742381	(16, 61.7)	0.7405

Source: Author's Computation 2025, using E-view 12.0 version

Table 8 presents the serial correlation test result. From the result, it can be observed that the data is free from serial correlation evidence from on the P-value of (lag 1) for the test which indicated that the P-value is greater than 0.05% (0.1104). This generally suggests that the data has not collide significantly, and thus we do not reject the null hypothesis that the data is free from a serial correlation.

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VAR Residual Normality Tests Result

Table 9: VAR Residual Normality Tests Result

Null Hypothesis: Residuals are multivariate normal				
Component	Skewness	Chi-sq	df	Prob.*
1	0.662905	2.343697	1	0.1258
2	2.217910	26.23534	1	0.0000
3	-0.230899	0.284343	1	0.5939
4	-1.185084	7.490268	1	0.0062
Joint		36.35364	4	0.0000

Source: Author's Computation 2023, using E-view 12.0 version

Table 9 presents the Normality test result. From the result, it can be observed that the data is normally distributed evidence from on the P-value of (lag 1) for the test which indicated that the P-value is greater than 0.05 (0.1258). This generally suggests that the data has not deviated significantly from normality, and thus we do not reject the null hypothesis that the data is from a normal distribution.

Causality Test Results

Table 10: Granger Causality Test Results

Pairwise Granger Causality Tests					
Lags: 4					
Null Hypothesis:	Obs	F-Statistic	Prob.	Decision	Remark
AGCSF does not Granger Cause CAI	32	0.59589	0.0497	Reject H_0	Unidirectional
CAI does not Granger Cause AGCSF		1.09816	0.3846	Accept H_0	
CBCA does not Granger Cause CAI	32	10.3663	0.0001	Reject H_0	Unidirectional
CAI does not Granger Cause CBCA		1.99279	0.1345	Accept H_0	
AET does not Granger Cause CAI	32	3.20565	0.0346	Reject H_0	Unidirectional
CAI does not Granger Cause AET		2.06739	0.1233	Accept H_0	

Source: Author's Computation 2025, using E-view 12.0 version

The Granger causality results in Table 10 reveal a unidirectional causal relationship from the Agricultural Credit Guarantee Scheme Fund (AGCSF) **to** food security (CAI)**,** as AGCSF ($p < 0.05$)Granger-causes CAI, while CAI does not Granger-cause AGCSF ($p > 0.05$**).** This indicates that AGCSF significantly influences food security during the study period.

Similarly, Commercial Bank Credit to the Agricultural Sector (CBCA)Granger-causes food security (CAI)**,** with no reverse causality from CAI to CBCA, indicating a one-way causal relationship. Likewise, Agricultural Expenditure on Training (AET) Granger-causes food security (CAI)**,** whereas no reverse causality exists. Overall, the findings indicate that AGCSF, CBCA, and AET exert significant unidirectional influences on food security in Nigeria.

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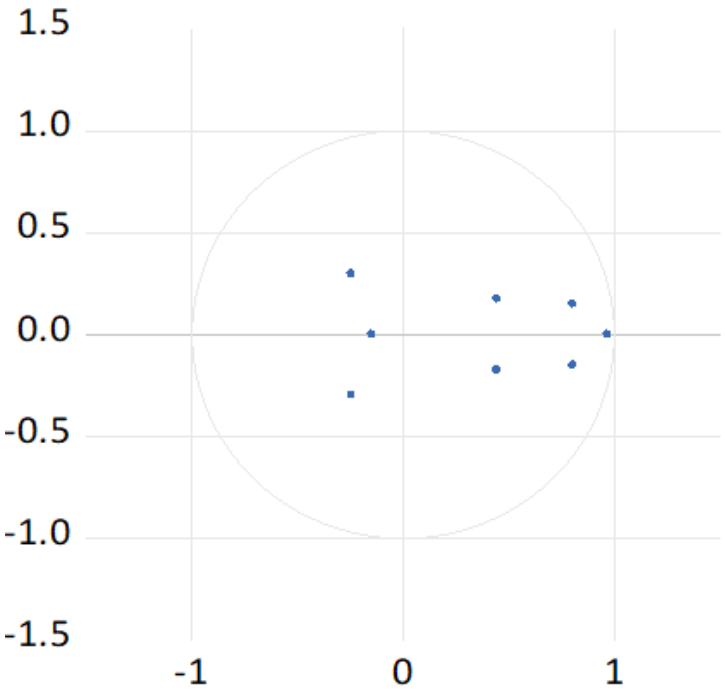
Stability Test Result

The variables stability test result is hereby shown in figure 1 below:

Fig 1: Inverse Roots of Polynomial



Source: Author's Computation 2025, using E-view 12.0 version

The stability test (Figure 1) shows that the inverse roots lie within the **5% critical bounds**, indicating that the VAR model is **stable**, with stable parameters suitable for long-run forecasting. This confirms that the estimates are dynamically and structurally consistent and reliable.

Discussion of Findings

The VAR results revealed that the Agricultural Credit Guarantee Scheme Fund (AGCSF) had a positive and statistically significant impact on food security in Nigeria. Although AGCSF reduced calorie intake by 2.2% in the short run, it increased calorie intake by 0.2% in the long run, indicating that its positive effect on food security is realized only over the long term.

Similarly, the VAR results indicate that commercial bank credit to the agricultural sector had a positive but statistically insignificant effect on food

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security, with increases in credit associated with higher calorie intake in both the short run (1.2%) and long run(1.4%). Similarly, agricultural expenditure on training showed a positive but statistically insignificant impact on food security, increasing calorie intake by 79.9% in the short run and 597.5**%**in the long run. Overall, both variables exhibited positive relationships with food security during the study period despite their statistical insignificance.

Implications of the Findings

The Federal Government of Nigeria should align agricultural financing with policy priorities and strengthen institutional capacity to ensure the effective implementation and sustainability of the Agricultural Credit Guarantee Scheme Fund (ACGSF), thereby enhancing food security and agricultural development.

Conclusion and Recommendations

This study examined the impact of agricultural financing on food security in Nigeria from 1990 to 2024 using unit root, cointegration, and Vector Autoregressive (VAR) analyses. The results confirmed that the variables are integrated of order one and suitable for VAR estimation. The findings revealed that the Agricultural Credit Guarantee Scheme Fund (AGCSF)**,** commercial bank credit to the agricultural sector (CBCA)**,** and Agricultural Expenditure on Training (AET) generally exerted positive effects on food security. However, AGCSF had a negative short-run effect but a positive long-run impact, while the short-run disequilibrium adjusted to long-run equilibrium.

Based on these findings, the study recommends that:

i) The Federal Government should encourage commercial banks to expand agricultural credit through lower lending rates, improve farmers' awareness of available credit facilities, and provide adequate security, improved seedlings, and pest control measures.
ii) Government should strengthen agricultural financing with increased investment in research, effective monitoring of programme performance, and policies that attract foreign direct investment into the agricultural sector.
iii) Both the public and private sectors should invest more in agribusiness and promote mechanized farming by providing farmers with modern machinery and other agricultural inputs to enhance food production and food security.

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