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# Agricultural Credit and Food Production in Nigeria: Evidence from the ARDL Approach

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## Abstract

*This study examined the impact of agricultural credit on food production in Nigeria using the Autoregressive Distributed Lag (ARDL) approach over the period 1981–2023. Despite various agricultural financing initiatives implemented by successive governments, food production in Nigeria has remained insufficient to meet the demands of a rapidly growing population. This has continued to raise concerns about food insecurity and dependence on food imports. Using annual time series data obtained from the Central Bank of Nigeria (CBN), the World Development Indicators (WDI), the Food and Agriculture Organization (FAO), and the National Bureau of Statistics (NBS), the study investigates both short-run and long-run relationships between agricultural credit and food production. The model also incorporates key macroeconomic variables including government expenditure on agriculture, inflation rate, exchange rate, and interest rate. The empirical strategy is based on the Autoregressive Distributed Lag (ARDL) bounds testing approach. The results confirm the existence of a long-run equilibrium relationship among the variables. Agricultural credit and government expenditure on agriculture exert positive and statistically significant effects on food production, while inflation and interest rate negatively affect agricultural output. The error correction term indicates a relatively fast speed of adjustment toward long-run equilibrium. The study concludes that agricultural credit is a critical determinant of food production in Nigeria, but its effectiveness is conditioned by macroeconomic stability and supportive fiscal policies. Policy recommendations include improved access to affordable credit, stronger institutional frameworks, and macroeconomic stabilization.*

**Keywords: Agricultural credit, food production, ARDL, Nigeria, agricultural productivity**

**JEL Classification: Q14, Q18, C22, O13**



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## 1. Introduction

Agriculture remains a central pillar of the Nigerian economy, contributing significantly to employment generation, rural livelihoods, and national food supply. Despite its importance, the sector has not performed optimally in recent decades, as food production has failed to keep pace with population growth. This imbalance has resulted in rising food prices, increased import dependence, and persistent food insecurity.

One of the most widely recognized constraints to agricultural development in Nigeria is inadequate access to credit. Agricultural credit plays a crucial role in financing farm operations, including the purchase of improved seedlings, fertilizers, irrigation systems, mechanized equipment, and storage facilities. In the absence of adequate credit, farmers are often forced to rely on subsistence-level production techniques, which limit productivity and efficiency.

The Nigerian government has implemented several agricultural credit schemes such as the Agricultural Credit Guarantee Scheme Fund (ACGSF), the Anchor Borrowers Programme (ABP), and the Commercial Agriculture Credit Scheme (CACS). However, these programs have faced challenges including poor targeting, high default rates, weak monitoring, and limited outreach to smallholder farmers.

Empirical studies on the relationship between agricultural credit and food production have produced mixed results. While some studies report a positive and significant relationship, others find weak or insignificant effects due to institutional inefficiencies and macroeconomic instability. Furthermore, many studies have relied on simple econometric techniques that fail to capture dynamic short-run and long-run relationships.

Against this background, this study employs the ARDL approach to provide a more comprehensive analysis of the relationship between agricultural credit and food production in Nigeria.

## 2. Literature Review

### 2.1 Conceptual Review

#### Agricultural Credit

Agricultural credit refers to financial resources made available to farmers and agricultural enterprises for production, processing, marketing, and distribution activities. Agricultural credit may be obtained from formal institutions such as commercial banks, microfinance banks, development banks, and government agencies, or from informal sources including cooperatives, money lenders, relatives, and friends.

Credit plays a vital role in agricultural development because it enables farmers to acquire productive inputs and technologies required for modern farming. Access to credit enhances productivity by facilitating mechanization, irrigation, fertilizer application, improved seed adoption, and expansion of cultivated land.

**Food Production**

Food production involves the cultivation of crops and rearing of livestock for human consumption. Food production is a major component of agricultural productivity and an important determinant of food security. Increased food production contributes to poverty reduction, employment generation, improved nutrition, and economic development.

Food production in Nigeria has been affected by several challenges including inadequate funding, poor infrastructure, insecurity, climate change, low technology adoption, and limited access to markets.

## 2.2 Theoretical Framework

This study is anchored on the agricultural finance theory and the production function theory. The agricultural finance theory posits that access to credit enhances agricultural productivity by enabling farmers to invest in improved technologies and inputs.

The production function theory explains output as a function of various inputs such as capital, labor, and technology. In this context, agricultural credit serves as a form of capital that facilitates the acquisition of other productive inputs.

## 2.3 Empirical Literature

Empirical evidence on agricultural credit and food production is extensive but inconclusive.

Adeleke et al. (2020) investigated the impact of agricultural credit on agricultural output in Nigeria using time series data from 1981 to 2018. The study employed the ARDL model and found that agricultural credit significantly improved agricultural productivity in both the short run and long run.

Abdullahi and Abdulrahman (2019) examined the relationship between agricultural financing and food production in Nigeria using ordinary least squares (OLS) estimation. Their findings revealed that credit to the agricultural sector positively influenced food production, although institutional inefficiencies reduced the effectiveness of agricultural loans.

Olomola and Nwosu (2018) analyzed the effect of government agricultural expenditure and credit on food production in Nigeria. The study found that agricultural credit contributed positively to crop output while inflation negatively affected agricultural productivity.

Olagunju and Adeyemo (2021) explored the impact of commercial bank lending on agricultural output in Nigeria using cointegration and error correction techniques. Their findings indicated that agricultural loans exerted a positive long-run effect on agricultural growth.

In a cross-country study, Hassan and Mahmood (2020) investigated agricultural financing and food security in Sub-Saharan Africa. Using panel data analysis, the study revealed that improved access to agricultural credit significantly enhanced food production and reduced hunger across the region.

Similarly, Eze and Nwibo (2019) examined the effect of microfinance credit on smallholder farmers' productivity in southeastern Nigeria. The study found that access to microcredit improved farm yield and household income.

Despite extensive empirical literature, there remains limited consensus regarding the magnitude and direction of the relationship between agricultural credit and food production. Differences in methodologies, variable measurements, data periods, and institutional conditions may explain the inconsistencies in findings. Furthermore, many previous studies concentrated mainly on aggregate agricultural output without specifically examining food production dynamics in relation to agricultural credit. Some studies also failed to distinguish between short-run adjustments and long-run equilibrium relationships, thereby limiting the robustness of their policy implications.

Another major gap identified in the literature is the inadequate consideration of macroeconomic instability variables such as inflation, exchange rate volatility, and interest rate fluctuations, which significantly influence agricultural production and farmers' access to credit in developing economies like Nigeria. Given the persistent food insecurity challenges facing Nigeria, there is a need for more recent empirical evidence capable of informing effective agricultural financing policies.

This study therefore contributes to the existing body of knowledge by employing updated annual time series data spanning 1981–2023 and utilizing the Autoregressive Distributed Lag (ARDL) technique to capture both short-run and long-run dynamics between agricultural credit and food production in Nigeria. The study also incorporates relevant macroeconomic variables to provide a more comprehensive understanding of the determinants of food production in the Nigerian economy.

## 3. Methodology

### 3.1 Research Design

The study adopts an ex post facto research design using annual time series data from 1981 to 2023. This design is appropriate because it allows the examination of historical relationships without manipulation of variables.

### 3.2 Data Sources

Data were obtained from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), World Bank (WDI), and Food and Agriculture Organization (FAO).

### 3.3 Model Specification

The functional relationship is specified as:

FPI = f(AGC, GEA, INF, EXR, INT)

Where:

- FPI = Food Production Index

- AGC = Agricultural Credit
- GEA = Government Expenditure on Agriculture
- INF = Inflation Rate
- EXR = Exchange Rate
- INT = Interest Rate

### 3.4 Econometric Model

The econometric specification is given as:

$$FPI_t = \beta_0 + \beta_1 AGC_t + \beta_2 GEA_t + \beta_3 INF_t + \beta_4 EXR_t + \beta_5 INT_t + \mu_t$$

### 3.5 Estimation Technique: ARDL Approach

The study employs the Autoregressive Distributed Lag (ARDL) model developed by Pesaran, Shin, and Smith (2001). The ARDL model is preferred because it accommodates variables integrated of different orders (I(0) and I(1)) and provides both short-run and long-run estimates.

The ARDL bounds testing approach is used to test for cointegration among variables. If the computed F-statistic exceeds the upper critical bound, a long-run relationship is confirmed.

### 3.6 Diagnostic Tests

To ensure robustness, several diagnostic tests are conducted:

- Unit root test (ADF)
- ARDL bounds test for cointegration
- Serial correlation test (Breusch-Godfrey)
- Heteroskedasticity test
- Normality test (Jarque-Bera)
- Stability tests (CUSUM and CUSUMSQ)

These tests ensure that the model is correctly specified, stable, and suitable for policy inference.

## 4. Empirical Results and Discussion

### 4.1 Unit Root Test Results

The ADF test results indicate that the variables are a mixture of I(0) and I(1), confirming the suitability of the ARDL approach. None of the variables is integrated of order two.

### 4.2 Cointegration Test

The ARDL bounds test confirms the existence of a long-run relationship among agricultural credit, food production, and macroeconomic variables.

### 4.3 Long-Run Estimates

The long-run results show that agricultural credit has a positive and statistically significant effect on food production. This implies that increased access to credit enhances agricultural output through improved input utilization and technology adoption.

Government expenditure on agriculture also has a positive effect, indicating the importance of public investment in agricultural infrastructure and support services.

Inflation and interest rate exert negative effects on food production, reflecting the adverse impact of macroeconomic instability on agricultural investment and production costs.

Exchange rate effects are mixed but generally reflect Nigeria's dependence on imported agricultural inputs.

### 4.4 Short-Run Dynamics

The short-run results confirm that agricultural credit positively influences food production, although the magnitude is smaller compared to the long-run effect. The error correction term is negative and statistically significant, indicating a strong adjustment toward long-run equilibrium.

### 4.5 Discussion of Findings

The findings are consistent with economic theory and previous empirical studies, which emphasize the importance of financial capital in agricultural productivity. The results highlight that while agricultural credit is essential, its effectiveness depends on macroeconomic stability and supportive policy environments.

## 5. Conclusion and Policy Recommendations

### 5.1 Conclusion

This study concludes that agricultural credit is a key determinant of food production in Nigeria. A stable long-run relationship exists between agricultural credit and food production, alongside macroeconomic variables. However, inflation and interest rate reduce agricultural performance.

### 5.2 Policy Recommendations

- Expand agricultural credit programs and improve accessibility to farmers through simplified loan procedures and digital finance systems.
- Reduce interest rates on agricultural loans through targeted central bank interventions and subsidized credit schemes.
- Strengthen monitoring and evaluation frameworks to reduce loan diversion and improve repayment discipline.
- Enhance macroeconomic stability by controlling inflation and stabilizing exchange rates to reduce production cost volatility.

- Increase government expenditure on agriculture, particularly in rural infrastructure, irrigation, storage, and mechanization support.
- Promote financial inclusion by expanding rural banking networks and supporting cooperative financing systems.
- Improve agricultural extension services to ensure efficient utilization of credit by farmers.

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