

## **Empowering Women in Agribusiness Through Financial Inclusion: Strategies for Enhancing Food Security in Nigeria.**

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### **Abstract**

*The pursuit of sustainable food production and delivery remains central to addressing global food insecurity, particularly in Africa, where this challenge directly aligns with the second goal of the Sustainable Development Goals (SDGs). This study examines the role of financial inclusion as a strategic tool for enhancing food security while simultaneously empowering women in the agribusiness sector. Although various opportunities for financial inclusion exist, structural barriers continue to limit women's full participation in the formal financial system, issues which are critically explored in this research. The study utilises secondary data sourced from the World Development Indicators covering the period 2011 to 2022 and applies the Auto-Regressive Distributed Lag (ARDL) model for analysis, following preliminary unit root tests. Empirical findings indicate that improved female access to financial services exerts a positive and statistically significant effect on food productivity, whereas the proliferation of commercial bank branches shows a negative and significant relationship with food productivity. These variables were employed to proxy financial inclusion. Based on these results, the study recommends active government intervention to improve rural road infrastructure, thereby facilitating greater outreach by commercial banks to underserved communities. Additionally, targeted sensitisation programmes are needed to educate female farmers on climate change adaptation strategies, given its implications for sustainable food production.*

**Keywords:** *Financial inclusion, Agribusiness, Sustainable Development Goal, Food Security*

## 1.0 Introduction

Agribusiness has been widely recognised as a pivotal sector within an economy, playing a critical role in addressing food insecurity a priority reflected in Sustainable Development Goal 2, which targets Zero Hunger. Beyond its contribution to food security, agribusiness supports job creation, enhances welfare and living standards, and drives overall economic growth, particularly in Sub-Saharan Africa and Nigeria, given the region's substantial agricultural potential (Doss, 2021). Despite the established benefits associated with agribusiness, women who form the backbone of agricultural production in many developing contexts continue to face significant barriers that hinder their full participation and productivity. Chief among these barriers is limited access to formal financial services and resources (Quisumbing, 2018). Strengthening purposeful financial inclusion initiatives for women in agribusiness would enable them to contribute more meaningfully to the fight against food insecurity by equipping them with the necessary financial resources to invest in, expand, and sustain agricultural activities (World Bank, 2020). Women are identified as critical role players in agribusiness, which significantly contributes to the production of food, processing, and distribution in Sub-Saharan Africa, including Nigeria. Research has unveiled these women are responsible for 60%-80% of food production in emerging economies, with a significant proportion of these women actively engaged in small-scale farming (FAO, 2020). Although in Nigeria, women are also key drivers of agribusiness, they lack access to vital resources which include technology, market information, and finance (Etim & Akinbile, 2021).

In the Nigeria context, rural settings, and other Sub-Sahara African nations, gender disparity amongst other challenging factors limits their access to productive resources as a result of customs, culture, traditions, limited education, inadequate access to financial products and services, and

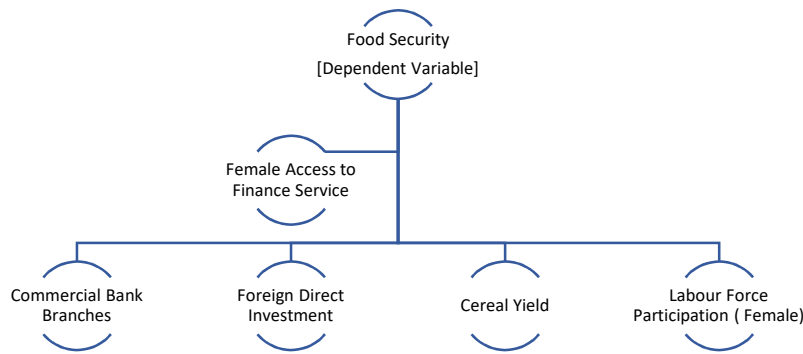
religion (Hasler & Lusardi, 2017; Kawuki & Nantogo, 2019; Hassan, Hsu & Kosar, 2021). Ezech (2020) discovered that culture and traditional structures in Nigeria had disproportionately affected women's ability to own lands and head financial resources which constrained their capacity to make sound decisions in agribusiness.

Various programs aimed at improving financial literacy such as the Alliance for Financial Inclusion (AFI) which has been successfully launched in Nigeria and Ghana amongst others have helped over 80% of member countries in Sub-Saharan Africa (AFI, 2020). Furthermore, the Kenya Financial Education Centre (KFEC) increased its financial literacy rate from 26% in 2016 to 38% in 2020 (CBK, 2020), and Rwanda's Financial Literacy Program, increased financial literacy among women by 15% between 2015 and 2020 (World Bank, 2021). However, the level remains unacceptably low, particularly among the rural population in developing countries. This issue is partly due to ineffective delivery strategies (OECD, 2011). Research by Fanta and Mutsonziwa (2021) highlights that the literacy rate that pertains to finance in Sub-Saharan Africa is approximately 32%, significantly below the 52% observed in advanced nations. Among Sub-Saharan African nations, Tanzania is ranked as the top country with a high percentage of financial literacy rate of 40%, seconded by Kenya at 38% and Uganda at 34% (Atkinson & Messy, 2011; Huston, 2010; Lusardi & Mitchell, 2014; CBK, 2020; Namaweje & Yawe, 2024).

The research problem at hand is the insufficient financial inclusion of women in Nigeria's agricultural sector, which limits their ability to contribute fully to agribusiness and food security by exploring the relationship between financial inclusion and women's empowerment in agriculture, this study aims to identify key strategies for overcoming existing barriers. Such strategies are essential for not only improving women's access to financial resources but also for enhancing their overall impact on agricultural productivity and food security in Nigeria.

The primary objectives of this study are to explore the challenges that hinder women from achieving empowerment in agribusiness and to identify effective strategies for overcoming these barriers through financial inclusion.

## 2. Conceptual Framework



Source: Author's Compilation (2024)

### 2.1 Literature Review

The integration of financial inclusion into women's empowerment in agribusiness has been a vision-driven agenda of research even in Nigeria which buttresses how having access to available and affordable financial services can drive agricultural productivity which is a panacea against food insecurity.

A study conducted by Okafor and Onyemelukwe (2018) investigated the effects of financial inclusion on women's empowerment and agricultural productivity. The study used secondary data with data period from 2013 to 2017. Using the Structural Equation Model, the study suggests that financial inclusivity positively impacts women's economic role in agriculture which combats insecurity as a result of insufficient production. As an eye opener, the study furthermore

recommends that for maximization of this benefit, there needs to be visible infrastructure and policy support.

Afolabi and Olowu (2019) investigated the role microfinance plays in contributing to women's empowerment in the Nigeria agricultural industry. Their findings unveil that microfinance institutions positively impact women empowerment, and it is statistically significant. Their study further emphasizes the financial institution's role in providing essential capital and other financial services. However, the policy effectiveness is anchored on the intentional implantation to involve farmers who are females.

Adewale's (2020) study takes into account that financial services such as microloans and savings accounts are an enabler for women to participate in agricultural business through the use of survey data and interview instruments. However, these women are constrained by the financial service accessibility and the existence of social-cultural barriers. The findings are supported by (Nwachukwu & Opara, 2020) who examined the part of financial inclusivity in addressing food security among women farmers in Nigeria. The study period was from 2014 to 2019 employing the fixed effect model and concluded that expanding financial services through inclusivity procedures is an important factor to combat the challenges that hinder food security.

Using the Tobit regression analysis in examining this impact, (Oluwatayo & Ojo, 2021), found that when women have access to microcredit, they had a higher propensity to aid an increase in the level of agricultural goods and household welfare. The study recommended mobile money services and rural microfinance institutions are needed to bridge the gaps such as lack of access to collateral, limited access to a formal financial institution, and cultural limitations.

Also, (Umar & Bello, 2022) research covered the study year 2016 to 2021 while utilizing both cross-sectional and time-series data, the study highlights that productivity and food security in Nigeria can be solved through improvement and efficiency in financial services as it provides an accessible means for women to invest into their respective farms and manage agricultural risk.

Outside the shores of Nigeria, notable studies have been done in this area to empirically explore the impact of financial inclusion or involvement of the financial system towards empowering women in agribusiness that contributes to solving the issue of food insecurity. (Bruhn & Love, 2014) study was on women entrepreneurs in Brazil's agricultural sector from 2005 to 2014 while employing the difference-in-difference methodology, the study highlighted collateral-free loans and flexible repayment terms should be made available to women as access to formal financial services was more likely to expand their current agribusiness.

In a study carried out by (Ngcobo & Monnakgotla, 2020), conducted in South Africa with a study period from 2010 to 2019 while employing the Structural Equation Modelling, the study discovered when there is increased access to financial products such as loans and savings account, there is a positive impact on women's ability to invest in agricultural inputs.

Similarly Southeast Asia, (Ahmed & Chowdhury, 2022) analysed the nexus between financial inclusion and women's involvement in agribusiness in the nation of Bangladesh between period 2015 to 2021. Employing the use of the Probit regression model, it was revealed that when women gained access to finance institutions and digital financial services, there was a higher probability they would engage in higher-value agricultural activities which includes cash crop production and livestock farming. A notable contribution of the study indicated that financial literacy and social capital played a key role in utilizing financial services which is a barrier hindering some women's involvement.

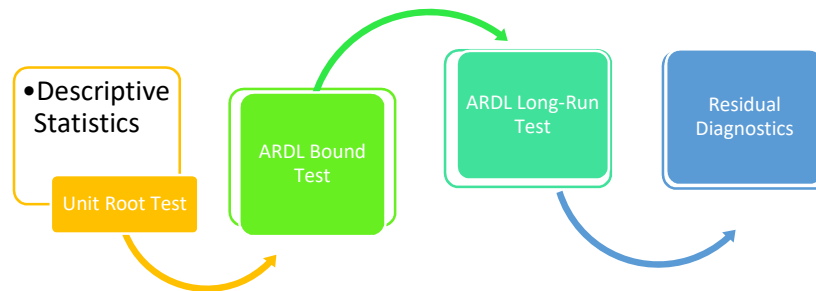
## 2.0 Theoretical Framework

The Capability Approach, as articulated by Amartya Sen (1999), offers a robust theoretical framework for analysing financial literacy within the agribusiness sector. This approach emphasizes the expansion of individuals' capabilities and freedoms to make well-informed financial decisions that align with their personal values and goals. Unlike traditional models that concentrate primarily on financial knowledge and skills, the Capability Approach provides a broader perspective by considering how financial literacy impacts individuals' ability to act on their financial knowledge effectively.

In the context of women in agribusiness, this framework is particularly pertinent. It goes beyond mere technical understanding of financial products and services to address the practical application of this knowledge in enhancing economic outcomes. The Capability Approach recognizes that effective financial literacy involves not only acquiring information but also overcoming systemic barriers that restrict individuals' capacity to use this information productively. By focusing on the empowerment of women through improved financial literacy and addressing constraints such as limited access to financial resources and cultural barriers, this approach aligns with the broader objectives of economic development and food security. Thus, it provides a comprehensive lens through which to evaluate the impact of financial inclusion strategies on women's roles and effectiveness in agribusiness.

### 3. Data and Methodology

#### Research Method Structure



Source: Author's Compilation (2024)

#### 3.1 Notation and Measurement of Variables

| Variables                           | Abbreviation | Definition and Measurement | Source |
|-------------------------------------|--------------|----------------------------|--------|
| Food Security                       | FS           |                            | WDI    |
| Female Access to Financial Services | ACC          |                            | WDI    |
| Commercial Bank Branches            | COM          |                            | WDI    |
| Foreign Direct Investment           | FDI          |                            | WDI    |
| Female Labour Force Participation   | LAB          |                            | WDI    |
| Cereal yield                        | CER          |                            | WDI    |

Source Author's Compilation (2024)

#### 3.2 Data

The model examines the impact of empowering women in Nigeria through financial inclusion as a strategy for enhancing food security between 2011 and 2022. The data was sourced from the World Development Indicator. This study period was selected because of the era where financial inclusion was deliberately incorporated into the Nigerian economy. The dependent

variable (FS) was used to capture food security, which was measured further as a function of independent variables: ACC, COM, FDI, LAB, and CER. This statement in functional form is written

### 3.3 Model Specification

This study employed the following models for the research objectives these models are the model specification as thus;

$$FS = F [ACC, COM, FDI, LAB, CER] \quad (1)$$

The paper went further to express this model to a a more econometric form as;

$$FS_{it} = \beta_0 + \beta_1 ACC_{it} + \beta_2 COM_{it} + \beta_3 FDI_{it} + \beta_4 LAB_{it} + \beta_5 CER_{it} + \mu \quad (2)$$

Where FS served as a proxy for food security and the dependent variable, other variables used for this analysis are the ACC, COM, FDI, and the CER [which represented; female access to financial services, commercial bank branches, foreign direct investment, labour force participation, and cereal yield respectively]. ).  $\beta_1, \beta_2$ , and  $\beta_3$  are the coefficients of the variables.  $\beta_0$  is the constant and  $\mu$  is the error term. The expected sign for female access to finance services is predicted to be positively impacted i.e ( $\beta_1 > 0$ ), also other contributing variables such as commercial bank branches, foreign direct investment labour force participation, and cereal yield also should be positive ( $\beta_2, \beta_4 > 0$ ), and ( $\beta_5 > 0$ ) respectively represented with  $\beta$  (Somoye, 2024)

as:

$$FS = F (ACC, COM, FDI, LAB \text{ and } CER) \quad (1)$$

Furthermore, it is expressed as an economic equation:

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 W_t + \beta_3 F_t + \beta_4 L_t + \beta_4 C_t + \varepsilon_t \quad (2)$$

Where Y is food security, X is female access to financial services, W is commercial bank branches, F is foreign direct investment, L is female labour force and C is cereal yield

Expressed in linear form while employing the Auto-Regressive Distributed Lag approach, the equation is written in long-run and short-run form (express the error correction model [ECM]) below: :

$$FS_t = \alpha_0 + \sum_{i=1}^p \beta_1 ACC_{t-i} + \sum_{i=0}^q \beta_2 COM_{t-i} + \sum_{i=0}^q \beta_3 FDI_{t-i} + \sum_{i=0}^q \beta_4 LAB_{t-i} + \sum_{i=0}^q \beta_5 CER_{t-i} + \gamma_1 ECM_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta FS_t = \alpha_{0j} + \sum_{i=1}^p \beta_{ij} \Delta ACC_{t-1} + \sum_{i=1}^{q1} \beta_{2j} \Delta COM_{t-1} + \sum_{i=1}^{q2} \beta_{3j} \Delta FDI_{t-1} + \sum_{i=1}^{q3} \beta_{3j} \Delta LAB_{t-1} + \sum_{i=1}^{q3} \beta_{3j} \Delta CER_{t-1} + \mu_i + \varepsilon_{it} \quad (3)$$

$$\Delta FS_t = \alpha_{0j} + \sum_{i=1}^p \beta_{ij} \Delta ACC_{t-1} + \sum_{i=1}^{q1} \beta_{2j} \Delta COM_{t-1} + \sum_{i=1}^{q2} \beta_{3j} \Delta FDI_{t-1} + \sum_{i=1}^{q3} \beta_{3j} \Delta LAB_{t-1} + \sum_{i=1}^{q3} \beta_{3j} \Delta CER_{t-1} + \gamma_1 ECM_{t-1} + \mu_i + \varepsilon_{it} \quad (4)$$

Where: FS is food security, ACC is female access to financial services, COM is commercial bank branches, FDI is foreign direct investment, LAB is female labour force, CER is cereal yield, and ECM is error correction model and  $\varepsilon$  is the error term.

### 3.4 Results and Discussion

For the purpose of this study, the result would be broken down into sections. To begin with, descriptive statistics are provided to give an analytical overview of the mean, standard deviation. Furthermore, a unit root test is conducted to determine the level of stationarity. Lastly, ARDL model is used to perform the analysis for this study and to critically unveil the type of relationships that exist amongst the variables under study.

**Table 1: Descriptive Statistics**

|                 | FOOD<br>SECURITY | ACCOUNT<br>OWNERSHIP | COMMERCIAL<br>BANKS | FDI      | CEREAL<br>YIELD | LAB      |
|-----------------|------------------|----------------------|---------------------|----------|-----------------|----------|
| Mean            | 103.6256         | 30.10938             | 4.954792            | 1.06981  | 24.40915        | 1559.171 |
| Median          | 108.505          | 28.6425              | 4.6775              | 0.782634 | 23.9025         | 1620.175 |
| Maximum         | 119.85           | 34.96                | 6.41                | 2.900249 | 29.888          | 1733.4   |
| Minimum         | 78.94            | 25.99                | 4.28                | 0.183821 | 22.687          | 1234.7   |
| Std. Dev.       | 12.97301         | 3.687744             | 0.693986            | 0.708294 | 1.949709        | 137.7947 |
| Skewness        | -0.50401         | 0.220213             | 0.711583            | 1.001821 | 1.45916         | -1.0316  |
| Kurtosis        | 1.886022         | 1.293574             | 2.031057            | 3.079372 | 4.411635        | 2.733076 |
| Jarque-Bera     | 2.257044         | 3.105863             | 2.964249            | 4.020883 | 10.5093         | 4.328064 |
| Probability     | 0.323511         | 0.211627             | 0.227155            | 0.13393  | 0.005223        | 0.114861 |
| Sum             | 2487.015         | 722.625              | 118.915             | 25.67545 | 585.8195        | 37420.1  |
| Sum Sq.<br>Dev. | 3870.874         | 312.7875             | 11.07717            | 11.53866 | 87.43142        | 436709.9 |
| Observations    | 24               | 24                   | 24                  | 24       | 24              | 24       |

***Source: Authors Computation (2024)***

The descriptive statistics provide a detailed view of the dataset's characteristics. Food Security exhibits a mean of 103.63, with moderate variability and a slight left skew, indicating a central clustering of values with some lower extremes. Account Ownership has a mean of 30.11% and shows limited variation with a slight right skew, reflecting a concentration of lower values.

Commercial Banks average 4.95 branches per 100,000 adults, with moderate variability and a slight right skew, pointing to a higher concentration of lower values. Foreign Direct Investment (FDI), averaging 1.07% of GDP, demonstrates considerable variability and right skew, indicating a prevalence of lower FDI values with occasional high extremes. Cereal Yield, with a mean of 24.41 tons per hectare, shows significant variability and right skew, suggesting the presence of some notably high values. Female Labor has a mean of 1559.17 thousand workers, with pronounced left skew and a platykurtic distribution, indicating high variability with a concentration around higher values. These statistics highlight diverse distribution patterns and central tendencies across the variables, crucial for understanding their economic implications.

**Table 2: Unit Root Test**

| VARIABLES                                       | ADF T-<br>STATISTICS | CRITICAL<br>VALUE | PROB.<br>VALUE | ORDER OF<br>INTEGRATION. |
|-------------------------------------------------|----------------------|-------------------|----------------|--------------------------|
| Food Security<br>(FS)                           | 5.168368             | 3.212696          | 0.0030         | I(1)                     |
| Female access<br>to financial<br>services (ACC) | 4.171083             | 3.259808          | 0.0140         | I(0)                     |
| Commercial<br>bank branches<br>(COM)            | 3.491071             | 3.212696          | 0.0330         | I(1)                     |
| Foreign Direct<br>Investment<br>(FDI)           | 6.249738             | 3.212696          | 0.0007         | I(1)                     |

|                              |          |          |        |      |
|------------------------------|----------|----------|--------|------|
| Cereal Yield<br>(CER)        | 9.164336 | 3.259808 | 0.0001 | I(0) |
| Female Labour<br>force (LAB) | 7.568820 | 3.175352 | 0.0001 | I(0) |

**Source: Authors Computation (2024)**

In Table 2, the unit root test is conducted to check the variable stationarity level. The critical value is set at 5% and from the computed result above, FS and COM are at order 1 while ACC, CER and LAB are at order level. Hence the null hypothesis was rejected for the variables examined under this study. This mixed level of stationarity informs the use of the Auto-Regressive Distributed Lag.

**Table 3: Bound Test**

|                |          |                                               |      |      |
|----------------|----------|-----------------------------------------------|------|------|
| F-Bounds Test  |          | Null Hypothesis:<br>No levels<br>relationship |      |      |
| Test Statistic | Value    | Signif.                                       | I(0) | I(1) |
|                |          | Asymptotic:<br>n=1000                         |      |      |
| F-statistic    | 60.20419 | 10%                                           | 2.08 | 3    |
| k              | 5        | 5%                                            | 2.39 | 3.38 |
|                |          | 2.50%                                         | 2.7  | 3.73 |
|                |          | 1%                                            | 3.06 | 4.15 |

**Source: Authors Computation (2024)**

From Table 3. bound test shown, using the 5% significance value, the lower threshold is 2.39 while the upper value is at 3.38. Given the F-statistic value of 60.20419 which is greater than both lower and upper value, there is a likelihood of a long-term stable relationship between the dependent

variable and the independent variables examined in this study. Hence, it is safe to reject the null hypothesis and conclude that there is a long-term relationship at 5% level of significance.

**Table 4: Auto Regressive Distributed Lag Model (ARDL) Long-run and Short-run Model**

| <b>LONG-RUN</b> |             |            |             |        |
|-----------------|-------------|------------|-------------|--------|
| Variable        | Coefficient | Std. Error | t-Statistic | Prob.  |
| ACC             | 0.252598    | 0.024938   | 10.12923    | 0.0001 |
| COM             | -25.7046    | 0.486407   | -52.8458    | 0.0002 |
| FDI             | -9.37569    | 0.405745   | -23.1073    | 0.0001 |
| LAB             | 2.609283    | 0.229187   | 11.38494    | 0.0002 |
| CER             | -0.06689    | 0.003158   | -21.1785    | 0.0001 |
| C               | 276.598     | 5.492091   | 50.36297    | 0.0001 |

*Source: Authors Computation (2024)*

| <b>SHORT-RUN</b> |             |            |             |        |
|------------------|-------------|------------|-------------|--------|
| Variable         | Coefficient | Std. Error | t-Statistic | Prob.* |
| FS               | 0.090919    | 0.066514   | 1.366924    | 0.2139 |
| ACC              | 0.041867    | 0.052951   | 0.790675    | 0.4551 |
| ACC(-1)          | -0.06104    | 0.070033   | -0.87153    | 0.4124 |
| ACC(-2)          | 0.2488      | 0.049658   | 5.010284    | 0.0015 |
| COM              | -11.2049    | 0.606007   | -18.4896    | 0.0040 |
| COM_(-1)         | 0.768564    | 0.786261   | 0.977492    | 0.3609 |
| COM_(-2)         | -12.9312    | 1.140154   | -11.3417    | 0.0004 |
| FDI              | -8.52326    | 0.77047    | -11.0624    | 0.0005 |
| LAB              | 3.82339     | 0.740939   | 5.160194    | 0.0013 |
| LAB(-1)          | 0.02781     | 0.633856   | 0.043875    | 0.9662 |
| LAB(-2)          | -1.47915    | 0.513354   | -2.88135    | 0.0236 |
| CER              | -0.018      | 0.004176   | -4.31126    | 0.0035 |
| CER_(-1)         | -0.0014     | 0.002558   | -0.54731    | 0.6012 |

|                    |          |                    |          |        |
|--------------------|----------|--------------------|----------|--------|
| CER_(-2)           | -0.04141 | 0.003696           | -11.2039 | 0.0002 |
| C                  | 251.4499 | 19.48967           | 12.9017  | 0.0001 |
| CointEq(-1)*       | -0.90908 | 0.032495           | -27.976  | 0.0001 |
| R-squared          | 0.999899 | Mean dependent var | 105.6877 |        |
| Adjusted R-squared | 0.999698 | S.D. dependent var | 11.42315 |        |
| F-statistic        | 4970.99  | Durbin-Watson stat | 2.379295 |        |
| Prob(F-statistic)  | 0.000001 |                    |          |        |

The study reveals a strong relationship between the dependent variable (FS) and the independent variables (ACC, COM, FDI, LAB and CER) with the R-squared 99.98% and an adjusted R-squared of 99.96%. The F-statistic with a p-value of 0.000002 which is less than the p-value of 0.05, indicates the model's appropriateness for policy-making. The Durbin-Watson statistic of 2.379295 indicates no autocorrelation

### **Interpretation of Result**

The long-run estimated model revealed that the constant term identified as food production is positive and statistically significant with a probability value of 0.0001, this is without injecting the independent variable contributions. Female access to financial service (account ownership) and female labour participation has a positive effect on food production a proxy for food security and they are both significant. However, commercial bank branches which is an access indicator of financial inclusion has a negative impact on food production and it is statistically significant. A justification for this result is seen practically that the rural area is where agriculture is often practised and carried out, however; the composition of commercial banks in rural areas over the years in this study period has not really seen infrastructural moves given known conditions such

as poor communication network, bad road network and national insecurity as major barriers. Rather, more commercial banks which are actively operated are seen in the urban areas of Nigeria. Foreign direct investment is likewise negative in its impact to food production and statistically significant. In the context of Nigeria, foreign direct investment is often attracted by the oil and gas sector which is the largest recipient, the telecommunications sector, followed by the manufacturing sector, the real estate sector and then the agricultural sector. The oil and gas sector ranks as the most sector given attention to in Nigeria and hence the expected resources to be channelled into the agriculture sector is likely to suffer given the nations level of priority.

Cereal yield in the long-run has a negative relationship with food production in Nigeria and it is statistically significant. This can be attributed to climate change issues which is hitting hard on the global world and adversely affects the growth of crops (Chandio, Ozturk, Akram, Ahmad & Mirani, 2020). Concerning food productivity in Nigeria, as a variable that contributes to food production, climate change and lack of adequate finances for the agricultural sector with modern machinery, lack of agricultural-specific adoption plan and sensitization on-farm practices to combat prevailing climate change effect would negatively impact food productivity.

Financial inclusion variables which include female access to financial services and commercial bank branches have exhibited positive and negative relationships respectively. Other studies such as (Okafor and Onyemelukwe, 2018; Afolabi and Olowu 2019; Ngcobo and Monnakgotla 2020; and Ahmed & Chowdhury, 2022) found there is a positive relationship between financial inclusion and food productivity which was a proxy for food security in this study. Furthermore, as identified in this study there is a negative relationship between commercial bank branches and food productivity, this finding rests on the discoveries of (Okafor & Onyemelukwe, 2018) that lack of sufficient infrastructure hindered productivity in the agricultural sector for female farmers and

(Oluwatayo & Ojo, 2021), whose study addressed that there should be rural institutions to bridge the gap in accessing financial services.

In the short-run estimation done, the given error correction co-efficient explains the speed of adjustment from any distortion that could emerge in the short-run advancing to the long run. The error correction is -0.90908 and it is statistically significant at 5% confidence. This result aligns to the theory backing up the use of the error correction acceptance that it has to be negative, below one and it should be statistically significant. From the figure, this implies that 90.908% of any disequilibrium is resorted in the first year.

### **3. Conclusion and Recommendations**

This study investigated the role of financial inclusion in empowering women within the agribusiness sector as a strategic pathway for enhancing food security in Sub-Saharan Africa, with a specific focus on Nigeria, where women constitute key contributors to agricultural production. The analysis employed two proxies for financial inclusion: female access to financial services, which demonstrated a positive and statistically significant relationship with food productivity, and the number of commercial bank branches, which was found to have a negative yet statistically significant association with food productivity, the chosen proxy for food security. The findings highlight that although opportunities for financial inclusion exist, multiple barriers continue to constrain women's participation in the financial system. These barriers include entrenched customs, cultural and religious norms, limited educational attainment, and restricted access to appropriate financial products and services.

#### **4. Recommendations**

Based on the study's findings, it is recommended that the government implement comprehensive structural development initiatives designed to facilitate greater financial inclusion, particularly for rural communities. This includes investing in critical infrastructure such as road networks to enable commercial banks to extend their physical reach to underserved areas.

Financial institutions should also prioritize the development and promotion of accessible and user-friendly digital banking platforms to accommodate individuals with limited proficiency in information and communication technologies. Furthermore, targeted sensitization programs on climate change adaptation should be established for female farmers to equip them with the knowledge and skills necessary to sustainably manage the impacts of climate change on agricultural productivity and ensure enhanced food security outcomes.

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