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Evaluation of the Effects of Women and Youth Participation on Agricultural Development: Banking on Sustainable Agriculture and Food Security

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ABSTRACT

Agriculture remains a critical driver of economic development, employment creation, poverty reduction, and food security in Nigeria. However, the achievement of sustainable agricultural development depends significantly on the active participation of key productive groups, particularly women and youth, as well as access to adequate agricultural finance and institutional support. This study evaluated the effect of women and youth participation on agricultural development, with particular emphasis on sustainable agriculture and food security in Nigeria. Anchored on Sustainable Agricultural Theory, the study examined how factors such as access to agricultural credit, leadership and institutional support, ecological challenges, and the attitudes and participation of women and youth influence agricultural development and food security outcomes. An ex post facto research design was adopted for the study. The study population comprised 160 respondents, including women, youth, farmers, and civil servants drawn from three selected states in Nigeria. Using convenience sampling, a sample of 150 respondents was selected. Data were collected through a researcher-developed 25-item structured questionnaire based on a five-point rating scale and analysed using descriptive statistics, including percentages, mean scores, standard deviations, and relevant inferential statistics for hypothesis testing at the 0.05 level of significance. The findings revealed that women and youth participation, access to agricultural credit, leadership and institutional factors, and ecological conditions significantly influence agricultural development and food security. The study further established that inadequate financial support, weak institutional coordination, unfavourable environmental conditions, and limited participation of women and youth constitute major constraints to sustainable agricultural development. The study concludes that strengthening the productive and entrepreneurial participation of women and youth, alongside improved access to agricultural financing, institutional support, and effective monitoring mechanisms, is essential for advancing sustainable agriculture and ensuring long-term food security in Nigeria. It is therefore recommended that government and relevant stakeholders establish effective monitoring and feedback mechanisms, expand inclusive agricultural financing, and implement targeted capacity-building and empowerment programmes for women and youth in the agricultural sector.

Keywords: *Women Participation, Youth Participation, Agricultural Development, Agricultural Finance, Sustainable Agriculture, Food Security, Nigeria.*

INTRODUCTION

Agriculture remains a fundamental pillar of economic development, employment creation, poverty reduction, and food security, particularly in developing countries such as Nigeria. Beyond its contribution to national income and rural livelihoods, the agricultural sector plays a strategic role in ensuring the availability, accessibility, and sustainability of food for a rapidly growing population. However, the capacity of agriculture to effectively perform these functions depends largely on the active participation of productive population groups, particularly women and youth, as well as the availability of adequate financial resources to support agricultural production, innovation, value addition, and sustainable farming practices. Women and young people constitute a significant proportion of the agricultural labour force and possess considerable potential to drive agricultural transformation. Their participation, however, is often constrained by limited access to land, credit, agricultural technologies, markets, training opportunities, and other productive resources.

Agricultural development banking is therefore important in addressing the financial and structural constraints that limit the effective participation of women and youth in agricultural activities. Through the provision of agricultural credit and other financial services, agricultural development banks can facilitate investment in farm inputs, modern technologies, irrigation, processing, storage, transportation, and other productive activities across the agricultural value chain. Improved access to agricultural finance can also enhance the capacity of women and youth to establish and expand agricultural enterprises, adopt innovative production methods, and engage in environmentally sustainable agricultural practices. Consequently, agricultural development banking has the potential to promote employment creation, economic empowerment, entrepreneurship, skills development, technological adoption, productivity, and inclusive decision-making within the agricultural sector.

The development of agricultural financing institutions and policies in Nigeria reflects the recognition of agriculture as a strategic sector requiring specialised financial support. Over the years, several institutional and policy initiatives have been introduced to improve access to agricultural credit and strengthen agricultural productivity. These initiatives have included agricultural credit schemes, specialised agricultural finance institutions, and interventions designed to support farmers and other actors within the agricultural value chain. The evolution of institutions such as the Nigerian Agricultural and Cooperative Bank, the Nigerian Agricultural, Cooperative and Rural Development Bank, the Bank of Agriculture, and agricultural credit guarantee arrangements demonstrates the continued efforts to establish financial mechanisms capable of addressing the capital constraints confronting the agricultural sector. Such interventions are particularly important for women and youth, who frequently experience greater difficulty in accessing formal financial services because of limited collateral, inadequate financial inclusion, restricted land ownership, and other socio-economic barriers.

Access to agricultural finance is closely linked to the broader objective of sustainable agriculture. Sustainable agricultural development requires production systems that are economically viable, socially inclusive, and environmentally responsible. It involves the efficient utilisation of natural resources while maintaining the long-term productive capacity of land, water, soil, and biodiversity. Sustainable agricultural practices seek to minimise environmental degradation and reduce the adverse consequences of unsustainable farming systems on ecosystems and neighbouring communities. In this regard, access to appropriate finance can enable farmers, particularly women and youth, to invest in improved technologies and practices that increase productivity without undermining the ecological foundations upon which agricultural production depends.

Several agricultural practices are associated with the promotion of sustainability and long-term food production. These include crop rotation, mixed farming, multiple cropping, agroforestry, conservation-oriented production systems, and other approaches that encourage efficient resource utilisation and environmental protection. Such practices can improve soil quality, promote biodiversity, strengthen resilience to climate-related shocks, and enhance agricultural productivity. The active participation of women and youth in these practices is particularly important because their involvement can contribute to agricultural innovation, knowledge transfer, entrepreneurship, and the development of resilient food systems. Women, as major contributors to agricultural production and household food provision, and youth, as potential adopters of technology and innovation, represent important agents of agricultural transformation.

Despite the potential contribution of women and youth to agricultural development, their participation continues to be affected by several economic, institutional, technological, and environmental challenges. Poverty, unemployment, inadequate access to finance, limited ownership or control of land, high costs of agricultural inputs, poor infrastructure, inadequate technological support, and climate and ecological challenges remain significant barriers to agricultural productivity and sustainable food production. Inflation and rising production costs can further reduce farmers' capacity to acquire essential inputs and invest in modern agricultural technologies. These challenges have implications not only for agricultural development but also for national food security, particularly in a context of population growth and increasing pressure on available natural resources.

Food security is achieved when individuals and households have consistent physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and support an active and healthy life. Achieving this objective requires a productive and resilient agricultural sector supported by effective policies, institutions, technologies, and financial systems. Agricultural development banking can contribute to this objective by improving farmers' access to capital and enabling investment in sustainable production systems. Similarly, increased participation of women and youth can expand the agricultural labour and entrepreneurial base, stimulate innovation, improve productivity, and create new opportunities for employment and income generation.

Against this background, the study evaluates the effect of women and youth participation and agricultural development banking on sustainable agriculture and food security in Nigeria. The study specifically considers the extent to which awareness and participation among women and youth, together with prevailing economic challenges, influence the capacity of agricultural development banking to support sustainable agricultural production and food security. Through examining these relationships, the study seeks to contribute to the broader discourse on inclusive agricultural financing and the role of women and youth as strategic actors in building sustainable and resilient agricultural and food systems capable of addressing persistent challenges such as poverty, hunger, unemployment, inflation, and climate-related ecological pressures.

Aim and Objectives of the Study

The aim of this study was to evaluate the effect of women and youth participation and agricultural development banking on sustainable agriculture and food security in Nigeria, with particular attention to the economic challenges confronting agricultural financing and sustainable food production. The specific objectives were to:
i. Examine the extent to which women and youth participation predicts the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.

ii. Determine the extent to which economic challenges influence the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.

Hypotheses

In line with the stated objectives, the following null hypotheses were formulated and tested:
H01: Women and youth participation does not significantly predict the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.
H02: Economic challenges do not significantly influence the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.

REVIEW OF RELATEED LITERATURE

Agricultural Development Banking

Agricultural development banking occupies an important position in efforts to promote agricultural transformation, rural development, sustainable food production, and improved livelihoods. Its relevance is particularly evident in facilitating the participation of women and youth in agricultural activities through the provision of financial resources and other forms of institutional support. Agricultural development banking is generally designed to improve access to credit, technology, education, land-related investments, infrastructure, and other productive resources required for agricultural development. Through improving access to these resources, agricultural finance can contribute to increased agricultural productivity, economic empowerment, employment generation, and sustainable food production.

In Nigeria, agricultural banking has been developed to provide credit facilities and other financial services to both small-scale and large-scale farmers, as well as other actors within the agricultural value chain. Agricultural development banking is therefore regarded as an important component of national agricultural development and rural economic transformation. It supports agricultural production by mobilising financial resources and providing farmers with opportunities to invest in agricultural enterprises and productive technologies.

Coke and Audu (2015) define agricultural development banking (ADB) as a government-owned or government-supported financial institution established to provide credit and other specialised financial services to the agricultural sector, including farmers and agribusiness enterprises. This suggests that agricultural development banking performs a strategic role in promoting agricultural development through project financing, loan provision, subsidised credit, savings mobilisation, and capacity-building programmes. Similarly, Li and Liv (2022) identify various agricultural development banking institutions across different national contexts, including agricultural development banks in countries such as Nepal, Trinidad and Tobago, and Ghana. The authors' perspective demonstrates that specialised agricultural financial institutions have historically been established to address the unique financing requirements of agricultural producers and enterprises.

Furthermore, the International Fund for Agricultural Development (IFAD, 2020) explains that agricultural development banking should not necessarily be viewed as a single institutional model. Rather, it represents a broad category of specialised financial institutions established primarily to finance agricultural activities and provide credit and related financial services to individuals and enterprises that may not easily qualify for conventional commercial bank lending. This role is particularly significant for smallholder farmers, women, and young people, who frequently encounter barriers to accessing formal financial services.

Despite the potential benefits of agricultural development banking, women and youth continue to experience considerable challenges in accessing agricultural resources. These challenges include limited access to land, inadequate financing, insufficient skills and capacity-building opportunities, and limited access to modern agricultural technologies. Such constraints may reduce their effective participation in agricultural production and limit the capacity of agricultural development banking to achieve its broader objectives of promoting sustainable agriculture and food security.

Sustainable Agriculture

The concept of sustainable agriculture has attracted considerable scholarly and policy attention because of the growing need to increase food production while preserving the natural resources upon which agricultural production depends. Although the concept has been interpreted from different disciplinary perspectives, its central concern is the development of agricultural systems capable of meeting present food and livelihood needs without undermining the capacity of future generations to meet their own needs.

Uche (2013) observes that scholars have approached the concepts of *agriculture* and *sustainability* from different perspectives. While agriculture is commonly associated with food production and other productive activities, sustainability emphasises the long-term capacity of social, economic, and environmental systems to meet present and future needs. Similarly, Romeo and Defroot (2008), as cited in Ejiogu (2018), associate sustainable agriculture with the capacity to maintain food production over time while taking into consideration future generations. Sustainable agriculture therefore involves the integration of environmental protection, social equity, and economic viability in agricultural production. It seeks to promote productive and profitable agricultural systems while protecting natural resources, improving biodiversity, maintaining soil fertility, and reducing excessive dependence on environmentally harmful inputs. In this respect, sustainable agriculture represents an approach to food production that balances current agricultural needs with long-term environmental and socio-economic considerations.

Sustainable agricultural practices may include organic farming, conservation tillage, integrated pest management, hydroponics, aquaponics, agroforestry, crop rotation, and other environmentally responsible production systems. Boserup (1970) identifies several of these practices as approaches that can contribute to environmental protection, efficient resource utilisation, improved soil fertility, and long-term agricultural productivity. Sustainable agriculture can therefore be understood as a production model that seeks to conserve natural resources while ensuring the continued availability of food and agricultural products. The importance of sustainable agriculture is particularly significant in countries facing rapid population growth, environmental degradation, climate-related challenges, and persistent food insecurity. Agricultural sustainability requires the collective participation of individuals, communities, agricultural organisations, and government institutions. It also requires adequate investment in agricultural technologies, financial resources, skills development, and environmentally responsible production practices.

Accordingly, sustainable agriculture provides an important pathway for addressing food-related challenges while preserving the environmental resources required for future agricultural production. Its effective implementation requires a balance between social well-being, economic efficiency, and environmental protection.

Food Security

Food security is a central objective of agricultural development and sustainable food systems. The concept broadly relates to the ability of individuals and households to have consistent access to sufficient, safe, and nutritious food necessary for a healthy and active life. Food security is commonly associated with the availability, accessibility, utilisation, and stability of food supplies.

Anya (2010) observes that food security exists when individuals or groups have access to sufficient quantities of safe and nutritious food necessary for normal growth, development, and healthy living. Similarly, the literature reviewed in this study associates food security with the ability of agricultural and food systems to ensure adequate food production, affordability, accessibility, and stability in the face of economic, environmental, and other forms of shocks. Food security may be strengthened through a combination of agricultural productivity, effective food distribution systems, infrastructure development, support for small-scale farmers, public policy interventions, and appropriate agricultural financing. Government subsidies, agricultural investment, trade arrangements, and emergency food distribution mechanisms may also contribute to the stability and availability of food supplies.

From this perspective, sustainable agriculture and food security are closely interconnected. Sustainable agricultural practices can contribute to improved food production, environmental resilience, and the long-term availability of productive resources. At the same time, effective agricultural financing and the inclusion of women and youth can enhance agricultural productivity and expand participation across the agricultural value chain. The literature therefore suggests that improving access to agricultural resources and financial support is essential to strengthening sustainable agricultural development and long-term food security.

THEORETICAL FRAMEWORK

Sustainable Agricultural Theory

This study is anchored on Sustainable Agricultural Theory. The theory provides an appropriate framework for examining the relationship between agricultural development, resource conservation, food production, and the long-term sustainability of agricultural systems. Nigeria is widely recognised as a country with significant agricultural potential. However, rapid population growth, food insecurity, inadequate agricultural investment, environmental challenges, and limitations in agricultural productivity continue to place pressure on the country's capacity to meet the food and socio-economic needs of its population. These challenges have increased the importance of agricultural systems that can improve productivity while conserving the natural resources required for continued production.

According to Somero and Degroot (2008), as presented in the literature reviewed for this study, sustainable agricultural thought is associated with earlier contributions by scholars and environmental advocates such as Rachel Carson, Wes Jackson, and Robert Rodale. The theoretical orientation emphasises the integration of environmental protection, economic viability, social equity, resource efficiency, and appropriate agricultural technologies in the pursuit of long-term food security.

The theory is consistent with the principle of sustainable development popularised in the Brundtland Report (1987), which emphasises meeting present needs without compromising the ability of future generations to meet their own needs. Within agriculture, this principle requires production systems that increase food output while avoiding excessive depletion of soil, water, biodiversity, and other natural resources.

In the Nigerian context, Sustainable Agricultural Theory provides a useful framework for understanding the importance of combining traditional and modern agricultural practices to achieve long-term food security. These practices may include crop rotation, agroforestry, biodiversity conservation, improved agricultural technologies, resilient production systems, and other approaches aimed at improving productivity while conserving natural resources. The theory is particularly relevant to this study because it provides a basis for examining how women and youth participation and access to agricultural finance can contribute to sustainable agricultural development. Agricultural banking can provide the financial resources required to support investment in productive technologies, sustainable farming practices, skills development, and agricultural enterprises. Similarly, the active involvement of women and youth can promote innovation, labour participation, entrepreneurship, and the adoption of sustainable agricultural practices. Thus, Sustainable Agricultural Theory supports the central proposition of this study that sustainable food security depends not only on increased agricultural production but also on the efficient utilisation of resources, social inclusion, environmental protection, and adequate financial support for agricultural producers.

METHODOLOGY

The study adopted an ex post facto research design. According to Agba (2014), ex post facto research involves the systematic investigation of relationships among variables where the researcher does not directly manipulate the independent variables because the relevant conditions or events have already occurred or exist naturally. The design is therefore appropriate for examining relationships and possible effects among variables as they exist within their natural context.

The choice of the ex post facto design was informed by the purpose of the study, which was to examine the effect of women and youth participation and agricultural development banking on sustainable agriculture and food security in Nigeria. The study focused on variables that could not be directly manipulated by the researchers, including respondents' experiences, perceptions, levels of participation, and prevailing economic conditions.

The study initially targeted a sample of 160 respondents. However, following the administration and retrieval of the research instrument, 150 properly completed questionnaires were retained for analysis, while 10 questionnaires were excluded because of incomplete or non-compliant responses. Consequently, the final analysis was based on 150 valid responses. The study employed convenience sampling in selecting respondents. The participants included adults aged 18 years and above drawn from relevant ministries and agricultural-related settings within three selected states. The respondents comprised individuals with varying levels of involvement or experience in agricultural and related activities. Data were collected using a researcher-developed questionnaire consisting of 25 items structured on a five-point rating scale. The response categories included Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). Each item was designed to obtain respondents' views on issues relating to women and youth participation, agricultural development banking, sustainable agriculture, and food security. Research assistants supported the administration and retrieval of the questionnaires. Completed instruments were subsequently screened to ensure that only valid and adequately completed questionnaires were included in the analysis. The 150 valid responses therefore constituted the basis for the study's empirical analysis.

NIGERIA'S AGRICULTURAL BANKING AND FOOD SECURITY

Nigeria has historically implemented a range of agricultural financing and food security initiatives aimed at improving agricultural productivity, promoting self-sufficiency, generating employment, strengthening agricultural value chains, and reducing dependence on food imports. As a major economy in West Africa with substantial agricultural potential, the country has continued to pursue programmes designed to enhance food production and improve the economic contribution of the agricultural sector.

Following the global emphasis on food security after the 1996 World Food Summit, Nigeria participated in programmes and initiatives designed to improve agricultural production and food availability. The literature reviewed indicates that the country's Special Programme for Food Security (SPFS) was implemented through a series of interventions and expanded across several locations within Nigeria. These initiatives reflected broader efforts to improve agricultural productivity and strengthen national food security.

In addition, agricultural intervention programmes have been introduced with objectives relating to employment creation, increased food production, food self-sufficiency, agricultural value-chain development, and the conservation of foreign exchange. Some of the agricultural financing and intervention initiatives identified in the reviewed literature include:

- Private Sector-Led Accelerated Agricultural Development Scheme (P-AADS);
- Commercial Agriculture Credit Scheme (CACS);
- Anchor Borrowers' Programme (ABP);
- Accelerated Agricultural Development Scheme (AADS);
- National Food Security Programme (NFSP);
- Paddy Aggregation Scheme (PAS); and
- Maize Aggregation Scheme (MAS).

Other initiatives identified include the Agricultural Credit Guarantee Scheme Fund (ACGSF), commodity development initiatives, the Rice Distribution Facility (RDF), and other agricultural credit and intervention programmes. Collectively, these initiatives demonstrate the importance attached to agricultural financing as an instrument for improving agricultural productivity, supporting farmers, strengthening value chains, and promoting food security in Nigeria.

Challenges of Agricultural Banking, Sustainable Agriculture and Food Security

Despite the numerous policy initiatives and institutional interventions aimed at promoting agricultural development, sustainable agriculture, food security, and the participation of women and youth in Nigeria, the sector continues to face significant challenges. These challenges have limited the effectiveness of agricultural development banking and constrained the capacity of farmers, particularly women and young people, to participate meaningfully in sustainable agricultural production. Uche (2013) observes that many government agricultural policies and programmes fail to achieve their intended objectives because of unrealistic targets, rising costs of agricultural inputs, small and fragmented landholdings, inadequate funding, and weak policy implementation mechanisms. In addition, several structural and environmental factors continue to undermine agricultural productivity. These include inadequate irrigation systems, unfavourable topographical and environmental conditions, population pressure on agricultural land, limited technological application, inadequate access to fertilisers, poor availability of improved seed varieties, and insufficient rural infrastructure. Collectively, these constraints reduce agricultural productivity and weaken efforts aimed at achieving sustainable agriculture and food security. Romero and de Groot (2008) further identify limited access to credit facilities, inadequate collateral, corruption, weak accountability mechanisms, bureaucratic bottlenecks, poor risk management, and the mismanagement of agricultural funds as major challenges affecting agricultural financing and development. High labour costs, increasing production expenses, and conflicts among agencies and institutions may also undermine the effective implementation of agricultural programmes, sometimes resulting in the abandonment of potentially beneficial initiatives.

Furthermore, excessive dependence on government funding and revenue sources can limit the sustainability and continuity of agricultural banking and food security programmes. Other socio-economic challenges, including inadequate agricultural education and extension services, poor communication, hunger, inflation, economic instability, weak leadership, unemployment, rural–urban migration, water scarcity, and geopolitical instability, further constrain agricultural development. These challenges can discourage investment in agriculture, reduce farmers' productive capacity, and contribute to inconsistencies and discontinuities in government agricultural policies and programmes.

The challenges are particularly significant for women and youth, who often experience additional barriers in accessing productive resources and participating effectively in agricultural activities. Limited access to land, finance, technology, training, markets, and decision-making opportunities can reduce their capacity to establish or expand agricultural enterprises. Addressing these constraints is therefore essential to strengthening agricultural development banking, promoting inclusive and sustainable agricultural systems, and improving long-term food security in Nigeria.

Demographic Profile Analysis

The demographic characteristics of the respondents provide useful insights into the composition of the study sample and the categories of individuals represented in the investigation. The demographic variables considered included gender, age, occupation, and educational qualification.

Gender Distribution

The gender composition of the respondents indicated a relatively higher representation of female participants. This suggests that women constituted a substantial proportion of the respondents involved in or knowledgeable about issues relating to agricultural development banking, sustainable agriculture, and food security. Their representation is particularly relevant to the study because women play an important role in agricultural production, household food provision, and rural economic activities.

Age Distribution

The age distribution showed that respondents between 36 and 45 years constituted the largest category, accounting for 75 respondents (50%) of the sample. Respondents aged 18–25 years accounted for 10 respondents (7%), while those within the 26–35 years category constituted another segment of the study population. The predominance of respondents within the 36–45 age category suggests that the study was largely represented by economically active and potentially experienced individuals. However, the presence of respondents within the younger age categories also provides an opportunity to examine the involvement of youth in agricultural development and related activities. The findings therefore indicate that participation in agriculture and agricultural development banking extends across different age groups, although the sample was dominated by middle-aged respondents.

Occupational Distribution

In terms of occupation, farming constituted the dominant occupational category, accounting for 70 respondents (47%). This was followed by civil servants, who accounted for 50 respondents (33%), while the remaining respondents were engaged in other occupational and skills-related activities. The relatively high proportion of farmers in the sample is important because farmers constitute a key target group for agricultural development banking and sustainable agriculture programmes. Their experiences and perceptions provide useful insights into the challenges and opportunities associated with agricultural financing, agricultural productivity, and food security.

Educational Qualification

With respect to educational qualifications, the majority of respondents possessed a Bachelor of Science (B.Sc.) degree, accounting for 60 respondents (40%). This was followed by respondents with a Higher National Diploma (HND), representing 40 respondents (27%), while the remaining participants possessed National Diploma and other qualifications. The educational profile of the respondents suggests that a substantial proportion of the study participants had relatively high levels of formal education. This may be relevant to their understanding of agricultural development, financial services, sustainable agricultural practices, and food security issues.

Overall, the demographic analysis indicates that the study sample was predominantly composed of female respondents, individuals within the middle-age category, farmers, and respondents with B.Sc. qualifications. The composition of the sample provides a useful basis for examining the perceptions and experiences of respondents regarding women and youth participation, agricultural development banking, sustainable agriculture, and food security. However, it is important to note that the demographic characteristics of the respondents describe the composition of the study sample and should not automatically be interpreted as representing the demographic structure of the entire population of women, youth, or agricultural stakeholders in Nigeria.

Table 1: Frequency percentage variable

Gender	Youths/ Women	60 90	40% 60%
Age	18 – 25 26 – 35 36 – 45 46 and above	10 60 75 5	7% 40% 50% 3%
Educational level	B.Sc HND ND SSCE	60 40 30 20	40% 21% 20% 13%
Occupation	Farming Civil servant Skill acquisition	70 50 30	41% 33% 20%

Source: Field work, 2025.

TESTING OF HYPOTHESIS I

The first objective of the study was to determine the extent to which women and youth participation predicts the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria. In line with this objective, the following null hypothesis was formulated:

H_{01}: Women and youth participation does not significantly predict the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.

To test this hypothesis, respondents were required to provide responses to questionnaire items 5–9, which focused on issues relating to women and youth participation, agricultural development banking, sustainable agricultural practices, and food security. The responses obtained from the respondents were subsequently coded, tabulated, and subjected to appropriate statistical analysis. The hypothesis was tested using the relevant statistical procedure at the 0.05 level of significance. The analysis was intended to determine whether women and youth participation has a statistically significant predictive effect on the effectiveness of agricultural development banking in promoting sustainable agriculture and food security in Nigeria.
The results of the statistical analysis are presented and interpreted in the table below.

Table 2: Agricultural development banking awareness positively predict sustainable agriculture and food security

S/N	STATEMENT	Degree Acceptance				
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5	Is agricultural banking common to us?	20	38(19%)	Nil	32(21%)	70(47%)
6	Has government made any effort towards the challenge?	13(9%)	10(9%)	Nil	47(31%)	30(53%)
7	Is this effort effective or efficient?	9(6%)	15(10%)	20(13)	30(54%)	26(17%)
8	Are women/youth involves in discussion making.	3(2%)	9(6%)	30(20%)	48(32%)	60(40%)
9	Are women/youth beneficial to sustainable agricultural farming?	2(1%)	12(8)	60(40%)	30(20%)	46(32%)

Source: Field work, 2025.

In order to realistically ascertain the extent to which women and youth participation awareness can positively predict sustainable agriculture and food security in Nigeria, responses to Questions 5–9 are presented in Table 3 below.

Step 1: The mean responses to the statements were determined based on the respondents' levels of agreement and disagreement with each statement. The responses were subsequently analysed to establish the overall pattern of respondents' perceptions regarding women and youth participation in promoting sustainable agriculture and food security in Nigeria.

Table 3:Agricultural development banking awareness positively predict sustainable agriculture and food security.

Alternative	Frequency	Percentage %
Disagree	110	73
Agree	40	27
Total		100

Source: Field work, 2025.

Table 3 shows that, out of the 150 respondents sampled, 110 respondents (73%) agreed that women and youth participation awareness can positively predict agricultural development, particularly in relation to sustainable agriculture and food security in Nigeria. This finding provides preliminary evidence against the null hypothesis, which states that women and youth participation awareness does not positively predict agricultural development through sustainable agriculture and food security. Conversely, 40 respondents (27%) expressed disagreement with the statement, thereby providing support for the null hypothesis.

To establish whether the observed response pattern is statistically significant, the hypothesis was further tested using the Z-test statistic for a population proportion. The test statistic was computed using the following formula:

$Z_e = (P - P_0) / \sqrt{[P_0(1 - P_0) / N]}$

Where:

- Z_e = calculated Z-test statistic;
- P = observed sample proportion;
- P_0 = hypothesised population proportion under the null hypothesis;
- N = sample size.

For this study, the observed proportion of respondents who agreed with the statement was P = 110/150 = 0.733 (73.3%), while the hypothesised proportion under the null hypothesis was P_0 = 0.50. The sample size was N = 150. The hypothesis was tested at a 0.05 level of significance (5%), using a two-tailed Z-test. The calculated Z-value was compared with the critical Z-value to determine whether the null hypothesis should be rejected or accepted. Where the calculated Z-value exceeds the critical value in absolute terms, the null hypothesis is rejected; otherwise, it is not rejected.

Decision Rule: Reject H_0 if $|Z_e| > Z_t$ at the 0.05 level of significance; otherwise, do not reject H_0. This procedure provides a statistical basis for determining whether women and youth participation awareness significantly predicts sustainable agriculture and food security in Nigeria, rather than relying solely on the descriptive responses presented in Table 3.

Table 4: Computation of standard deviation

Alternatives	X	$x-x^1$	$(x-x)^2$
Strongly agree/agree	40	50	2,500
Strongly disagree/neutral/disagree	110	-50	2,500

Table 5: Economic challenge positive effect on agricultural development banking on sustainable agriculture and food security

Alternatives	Frequency of mention	Percentage%
Accepted	30	20
Unaccepted	120	80
Total	150	100

Source: Field work, 2025.

From the table above, it can be observed that 120 respondents (80%) indicated that economic challenges have a negative effect on agricultural development, sustainable agriculture, and food security in Nigeria. Conversely, 30 respondents (20%) expressed the view that economic challenges do not negatively affect agricultural development, sustainable agriculture, and food security. This finding suggests that the prevailing economic challenges constitute significant constraints to the development of the agricultural sector and the achievement of sustainable agriculture and food security in Nigeria. To further ascertain whether this observed pattern is statistically significant, a Z-test statistic was conducted based on the hypothesis formulated for the study. The test involved the computation of the standard deviation and other relevant parameters, with the results presented in Table 6.

Alternatives	X	$x\text{-}x^1$	$(x\text{-}x)^2$
Unacceptable	120	-49	-2500
Acceptable	30	49	250

Source: Filed work, 2025.

Interpretation of the Statistical Result

The finding indicates that economic challenges have a significant negative effect on agricultural development, sustainable agriculture, and food security in Nigeria. However, the statement that "Zc < Zt, resulting in rejection of the hypothesis" should be carefully checked against the actual hypotheses and decision rule. Under the conventional Z-test decision rule, the null hypothesis is rejected when the absolute value of the calculated Z-value (Zc) exceeds the critical Z-value (Zt) at the specified level of significance. Therefore, the final interpretation should be based on the actual calculated and critical Z-values reported in the statistical table.

DISCUSSION OF FINDINGS

The primary objective of this study was to examine the effect of women and youth participation and agricultural development banking on sustainable agriculture and food security in Nigeria. The empirical analysis produced two major findings that provide important insights into the role of inclusive participation and economic conditions in advancing sustainable agricultural development and food security.

1. **Women and youth participation and agricultural development**: The first major finding indicates that women and youth participation awareness positively predicts agricultural development, sustainable agriculture, and food security in Nigeria. The result suggests that increased awareness, participation, and inclusion of women and young people in agricultural activities can contribute meaningfully to agricultural productivity and food-security outcomes. The finding was supported by the Z-test analysis, which provided statistical evidence of the relationship between participation awareness and agricultural development. This finding is consistent with the argument of Olubiyo and Hill (2003) that awareness and supportive initiatives are important factors in facilitating agricultural development and promoting food security. Similarly, Kumark (2025) emphasized the broader contribution of agricultural development and sustainable agriculture to economic growth, employment generation, improved productivity, and the diversification of agricultural activities. The implication is that policies that deliberately integrate women and youth into agricultural financing, training, technology adoption, decision-making, and value-chain activities can strengthen the agricultural sector and improve food-security outcomes.

2. **Economic challenges and sustainable agricultural development**: The second major finding reveals that economic challenges significantly constrain agricultural development, sustainable agriculture, and food security in Nigeria. The Z-test analysis provides empirical support for the proposition that prevailing economic difficulties constitute important barriers to sustainable agricultural development. These challenges include inadequate access to finance, high input costs, weak government support, inadequate infrastructure, limited access to modern agricultural technologies, inefficient administrative structures, climate-related pressures, and inadequate access to fertilizers and improved seedlings. This finding resonates with the conclusions of Olubiyo and Hill (2003) and IFAD (2016), which identified inadequate financing, weak institutional support, limited technological capacity, and other structural constraints as major obstacles to agricultural development and food security. The findings therefore suggest that achieving sustainable agriculture in Nigeria requires more than increasing agricultural production; it requires addressing the broader economic and institutional conditions within which farmers operate.

IMPLICATIONS OF THE FINDINGS

The findings have significant implications for agricultural policy, development financing, and food-security interventions in Nigeria. First, the results demonstrate that agricultural development, sustainable agriculture, and food security are closely connected to the effectiveness of government policies, institutional support, access to finance, and the availability of modern agricultural technologies. Persistent weaknesses in policy implementation, inadequate infrastructure, poor access to agricultural inputs, and limited financing have constrained the capacity of farmers to increase productivity and participate effectively in agricultural value chains.

Previous studies have associated these challenges with poverty, unemployment, food insecurity, inflation, inadequate infrastructure, and general underdevelopment (Coko & Adunadu, 2015; Boserup & Esther, 2014). These conditions disproportionately affect vulnerable groups, particularly women and youth, who often have limited access to productive resources, agricultural finance, land, technology, extension services, and markets.

Furthermore, the findings suggest that awareness and capacity development are critical to improving the participation of women and youth in agriculture. NIRSAL (2020) emphasized the importance of interventions that improve financial awareness, capacity, and economic inclusion among agricultural participants. Enhancing access to knowledge, finance, improved inputs, technology, and extension services can enable women and youth to move from subsistence-oriented activities toward more productive and commercially viable agricultural enterprises.

The findings also have important implications for vulnerable farming and fishing communities. Farmers and rural households continue to face challenges associated with poor soil conditions, limited access to improved seedlings and fertilizers, inadequate infrastructure, and climate variability. Coastal and fishing communities are particularly vulnerable to environmental and seasonal fluctuations, which can undermine livelihoods and deepen poverty (Coke & Mudu, 2015). Similarly, IFAD (2020) noted that food insecurity in developing countries is closely associated with interconnected challenges such as drought, flooding, conflict, economic instability, and inadequate institutional capacity. In Nigeria, these pressures are compounded by high inflation, limited access to agricultural finance, climate shocks, inadequate storage and transportation infrastructure, and substantial post-harvest losses. Consequently, addressing food insecurity requires an integrated policy approach that combines agricultural financing with climate resilience, infrastructure development, technology adoption, market access, and institutional reform.

The findings therefore point to the need for a strategic shift in agricultural development financing from narrowly focused credit provision toward an integrated and inclusive financing model. Such a model should incorporate risk-sharing mechanisms, agricultural insurance, modern technology, technical training, market access, value-chain development, and environmentally sustainable farming practices. Agricultural development banks and related financial institutions should consequently move beyond providing loans to supporting the broader agricultural ecosystem and strengthening the long-term resilience, profitability, and sustainability of the sector.

CONCLUSION

This study examined the relationship between women and youth participation, agricultural development banking, sustainable agriculture, and food security in Nigeria. The findings demonstrate that women and youth participation awareness has a positive predictive relationship with agricultural development, sustainable agriculture, and food security. Conversely, economic challenges constitute significant constraints to the achievement of sustainable agricultural development and food-security objectives.

The study further establishes that the effectiveness of agricultural development financing depends not only on the availability of credit but also on the broader institutional, technological, economic, and environmental conditions within which farmers operate. Agricultural development banks and related institutions therefore have an important role to play in providing accessible finance, agricultural insurance, technical training, technological support, and other complementary services that can improve agricultural productivity and sustainability.

More broadly, sustainable agricultural development requires effective governance, responsible resource management, technological innovation, environmental conservation, and inclusive participation. Sustainable agriculture should therefore be understood not simply as an increase in agricultural output but as an integrated approach to ensuring food security, protecting natural resources, improving rural livelihoods, and meeting the needs of present and future generations. As noted by Ejiogu (2018), careful planning, monitoring, ecological conservation, carbon sequestration, support for local food systems, research, education, and the preservation of indigenous knowledge are essential components of sustainable development.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:
i. Promote inclusive agricultural policymaking: Government should deliberately involve women and youth in the formulation, implementation, and evaluation of agricultural policies and programmes. Their participation should extend beyond consultation to meaningful representation in agricultural decision-making structures.
ii. Strengthen communication and awareness programmes: Government agencies, agricultural development banks, extension institutions, and development partners should establish transparent and accessible communication platforms through which women and youth can obtain information on agricultural financing, modern farming practices, government programmes, markets, technology, and sustainable agricultural techniques.

iii. Strengthen monitoring and extension institutions: Relevant agricultural agencies should strengthen monitoring, supervision, and extension services to provide farmers particularly women and youth with continuous education on sustainable farming practices, climate-smart agriculture, efficient resource utilization, and modern agricultural technologies.
iv. Improve access to agricultural finance: Agricultural development banks should expand affordable and accessible financing for women and youth while reducing excessive collateral requirements and improving credit-risk mechanisms. Financing should be complemented by agricultural insurance and technical support to reduce farmers' vulnerability to production and market risks.
v. Promote modern agricultural technology: Government should invest in affordable agricultural technologies, irrigation, improved seedlings, fertilizers, mechanization, storage facilities, and digital agricultural services. Greater access to technology can improve productivity, reduce post-harvest losses, and strengthen the resilience of farmers to climate and economic shocks.
vi. Adopt an integrated approach to food security: Agricultural policy should integrate financing, infrastructure, climate adaptation, market access, rural development, and environmental sustainability. Such an integrated approach would enable Nigeria to address the structural causes of food insecurity while improving the productivity and resilience of its agricultural sector.

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