FUDMA Journal of Agriculture and Agricultural Technology
ISSN: 2504-9496
Vol. 11 No. 4, December 2025: Pp. 124-132

https://doi.org/10.33003/jaat.2025.1104.14

CREDIT USE AND HOUSEHOLD FOOD SECURITY AMONG FARMING HOUSEHOLDS IN OGUN STATE, NIGERIA

[1]ADEBAYO Toluwalope Abayomi, [1]DIPEOLU Adewale Oladapo, [1]ADEGBITE Dorcas Adetokunbo, [1]TOLU-ADEBAYO Grace
Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, P.M.B 2240, Abeokuta, Ogun State, Nigeria.
Corresponding e-mail: adebayo.toluwalopea@gmail.com

ABSTRACT

This study examines the relationship between credit use and household food security among farming households in Ogun State, Nigeria. Using primary data from 192 households selected through a multistage sampling technique, the study applies descriptive statistics, a food security index based on per capita food expenditure, and a logit regression model. Results indicate that 56.8% of households are food secure, with a higher incidence of food secure households among credit users (60.8%) than non-credit users (54.0%). Logit estimates show that farming experience, extension contact, and the amount of credit accessed significantly increase the likelihood of household food security, while household size and dependency ratio exert a negative effect. The findings underscore the importance of improved access to agricultural credit and extension services in enhancing household food security. Policy interventions aimed at strengthening inclusive rural financial systems are therefore critical for sustainable food security outcomes.

Key Words: Credit Use; Food Security; Farming Households; Logit Model; Nigeria.

INTRODUCTION

Agriculture remains a central pillar of livelihoods and food systems in many developing economies, particularly in Sub-Saharan Africa, where a large proportion of the population depends on smallholder farming for income and sustenance. With global population projected to exceed 9.6 billion by 2050, pressures on agricultural production and food systems are expected to intensify, especially in low- and middle-income countries (Shah et al., 2024). These pressures are further compounded by income volatility, climate variability, and structural constraints facing rural households.

Food security, defined as a situation in which all people have physical, social, and economic access to sufficient, safe, and nutritious food always, remains a persistent challenge in Nigeria (FAO, 2019). Despite the country's vast agricultural potential, food insecurity continues to affect a substantial proportion of rural households, particularly smallholder farmers who rely on rain-fed agriculture and face seasonal income fluctuations. At the household level, food insecurity is often driven not only by insufficient food availability but also by limited access to productive resources and financial capital.

Access to agricultural credit has long been recognised as a critical mechanism for enhancing farm productivity, smoothing consumption, and improving household welfare (Rasheed et al., 2024). Credit enables farming households to purchase inputs, adopt improved technologies, and manage liquidity constraints associated with the seasonal nature of agricultural production (Lemecha, 2023). Beyond production, credit also plays an important role in stabilising household consumption during the lean season, thereby reducing vulnerability to food insecurity (Bonuedi et al., 2022). However, in many developing countries, smallholder farmers face persistent barriers to accessing and effectively utilising credit due to institutional weaknesses, high transaction costs, and exclusion from formal financial systems.

In Nigeria, several studies (Adigun, 2022; Adesiyan and Kehinde, 2024; Mounirou and Lokonon, 2022) have examined food security among rural households and the determinants of agricultural credit access. However, much of the existing literature (Adigun, 2022; Adesiyan and Kehinde, 2024) focuses primarily on credit access rather than credit use, implicitly assuming that access automatically translates into welfare gains. This assumption overlooks the possibility that households may access credit but utilise it sub-optimally or divert it to non-productive purposes, thereby limiting its potential impact on food security. Moreover, empirical evidence linking the amount of credit utilised to household food security outcomes at the sub-national level remains limited.

This study addresses this gap by empirically examining the relationship between credit use and food security among farming households in Ogun State, Nigeria. Ogun State provides a relevant empirical setting due to its agrarian structure, proximity to major urban markets, and the coexistence of formal and informal credit institutions (Odunsi et al., 2024). By focusing on actual credit utilisation rather than access alone, the study contributes to the literature by providing policy-relevant evidence on whether and how credit use improves household food security.

Specifically, the study aims to: (i) identify the sources and amounts of credit utilised by farming households; (ii) assess the food security status of farming households using a food security index based on per capita food expenditure; and (iii) analyse the effect of credit use and selected socioeconomic factors on household food security. The findings are expected to contribute to policies on rural finance, agricultural extension, and food

security interventions in Nigeria and similar developing-country contexts.

Theoretical Framework

This study is grounded on three theoretical perspectives: consumption smoothing theory, the agricultural household model, and the sustainable livelihoods framework. Consumption smoothing theory posits that households seek to stabilise consumption over time despite income volatility (Magubane and Mothibi, 2025). In agrarian settings, income is inherently seasonal, exposing farming households to periods of food shortage. Credit serves as a financial instrument that allows households to smooth consumption during lean periods, thereby reducing food insecurity.

The agricultural household model complements this perspective by recognising that farm households simultaneously make production and consumption decisions (Strauss, 1984; LaFave et al., 2025). Liquidity constraints limit the ability of households to invest in productivity-enhancing inputs while maintaining adequate food consumption (Adeyeye, 2025). Credit relaxes these constraints, enabling households to improve farm output and household welfare simultaneously. Household characteristics such as farming experience and access to extension services enhance the effectiveness of credit by improving decision-making and productivity, while larger household size and higher dependency ratios increase consumption pressure and may offset welfare gains.

The sustainable livelihoods framework further conceptualises food security as an outcome of the interaction between household assets financial, human, social, and institutional within a given vulnerability context (Ehteshammajd et al., 2023). Access to credit alone may be insufficient to guarantee food security complementary assets and institutions such as extension services and farming experience that enable effective utilisation of financial resources are limited. Conversely, demographic pressures represent structural vulnerabilities that constrain households' ability to convert assets into improved food security. In this study, credit represents financial capital, while farming experience, education, and extension contact represent human and institutional capital. Household size and dependency ratio capture vulnerability factors that mediate food security outcomes. These frameworks provide a basis for analysing the determinants of household food security in this study.

MATERIALS AND METHOD

Study Area

The study was conducted in Ogun State, Nigeria. This area was considered most appropriate because of its agrarian nature. The state is one of the thirty-six states in Nigeria and has a land mass of about 1.7 million hectares with about 2.5 percent of the Nigerian population (Odunsi et al., 2024). It borders Lagos state to the south, Oyo and Osun State to the North, Ondo State to the East and the Republic of Benin to the West. Ogun State is made up of twenty (20) Local Government areas which are spread across the four main agricultural zones of the state namely Egba, Ijebu, Remo and Yewa/Awori.

There are two distinct seasons in the state namely, the rainy season and the dry season and two main types of vegetation which are the tropical rain forest and the guinea savannah. The tropical rainforest is found in the coastal areas, mainly in Ogun waterside and part of the Yewa zone. Rainforests are found in some parts of the Ijebu zones of the state. Guinea and derived savannah are found in most of the western and northern parts of the state. The concentration of livestock production, poultry egg production in these areas could be traceable to the perceived favourable characteristics of the vegetation in the area which is predominantly rainforest and derived savannah.

Data Source and Method of Data Collection

Primary data were used for this study. The data were obtained through the administration of a well-structured questionnaire to collect information from the farming households on their socio-economic factors, food expenditure pattern and credit information of the farming households.

Survey Techniques and Sample Size

A multi-stage sampling technique was used for this study, and the sampling frame was based on the Agricultural Development Programme zoning (ADP zones) in Ogun State, which is made up of four zones namely Abeokuta, Ilaro, Ikenne and Ijebu zones. In the first stage, three ADP (Abeokuta, Ikenne and Ijebu) zones in Ogun State were selected using simple random sampling while in the second stage two blocks were randomly selected from each of the zones selected in Ogun State using simple random sampling. The third stage involved a random selection of two cells from each block selected. In the fourth stage, 16 farming households were randomly selected from each cell chosen to make up a total of 192 households that were used for the study.

A post survey analysis showed that seventy-nine (41.1%) of the farming households were credit users while one hundred and thirteen (58.9%) farmers were Non-credit users as shown in Table 1.

Table 1: Disaggregation of the Respondent based on Credit Usage.

Categories	Frequency	Percentages
Credit User	79	41.1
Non-Credit Users	113	58.9

Methods of Data Analysis

The data obtained from this study were analysed using both the descriptive and quantitative analytical tools. Descriptive statistics was used to describe the socioeconomic characteristics such as age, sex, household size, and other demographic characteristics of the rural farming households in the study area, the sources of credit used by the farming households and the various sources of income of the households. This was done with the use of frequency tables, means, percentages and standard deviation.

Food Security Index

This method was used to determine the food security status of the farming households. The food security index was used in classifying the households into either food secure or food insecure (Aliyu, 2023; Olumba et al., 2023; Adewale and Belewu, 2022). This was based on the per capita monthly food expenditure of all the households in the study area which was gotten by dividing the household food expenditure by its adult equivalent.

The adult equivalent was gotten using the FAO adult equivalent scale adopted by Akerele *et al.*, (2016). A food secure household will be the households whose mean per capita food expenditure is above or equal to two-third of the mean per capita food expenditure of all the households in the study area while any household that has a value below it will be classified as food insecure (Aliyu, 2023, Olumba et al., 2023).

The Food Security Index is given as:

$$F_i = \frac{Per\ capita\ food\ expenditure\ for\ the\ ith\ household}{^2/_3\ of\ mean\ per\ capita\ food\ expenditure\ of\ all\ household} \quad \text{.....Eq. (1)}$$

Where:

F_i = Food Security Index

$F_i \geq 1$ = Food Secure Household

$F_i < 1$ = Food Insecure Household

Logit Regression Analysis

The standard form of the Logit model for estimation purpose is specified in Gujarati (1998) and Greene (2003). Given a binary dependent variable indicating food security status, a logit regression model was employed. Let $Y_i = 1$ if household i is food secure and 0 otherwise. The probability of being food secure is specified as:

$$P(Y_i = 1) = \frac{e^{z_i}}{1 + e^{z_i}} \quad \text{..... Eq. (2)}$$

Where:

$$Z_i = \beta_o + \sum_{k=1}^{12} \beta_k X_{ki} + u_i \quad \text{..... Eq. (3)}$$

Y_i = Probability of the household being food secure

$Y_i = 1$ if the household is food secure

$Y_i = 0$ if the household is not food secure

X_1 = Age of Household Head (Years)

X_2 = Gender of Household Head (dummy; male =1, female=0)

X_3 = Household size (Total number of household members)

X_4 = Marital status (Dummy: Married = 1, Otherwise = 0)

X_5 = Farming Experience (Years)

X_6 = Year of Education of Household Head (Years)

X_7= Farm Size (Hectares)

X_8 = Extension Contact (number of contacts within the production season)

X_9= Membership of Cooperative (Dummy: member=1, Otherwise=0)

X_{10}= Dependency ratio (Ratio of working to non-working household members)

X_{11}= Household Head Income (₦)

X_{12}= Amount of credit (₦)

U_i = Error term.

The coefficients were estimated using maximum likelihood estimation, and marginal effects were computed to assess the magnitude of influence of explanatory variables.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Farm Households

Table 2 summarises the socioeconomic characteristics of the sampled households. The results indicate that farming households are predominantly male-headed, middle-aged, and married, with an average household size of six persons. These characteristics are typical of smallholder farming systems in southwestern Nigeria and have important implications for household food security.

From a theoretical perspective, household size and dependency structure are key vulnerability factors within the sustainable livelihood framework. Larger households increase consumption requirements, which may dilute income and credit resources, thereby heightening the risk of food insecurity. The relatively low mean monthly income further suggests liquidity constraints, reinforcing the relevance of credit as a consumption-smoothing instrument.

Most household heads possess at least basic formal education and substantial farming experience, indicating the presence of human capital necessary for effective utilisation of productive resources. According to the agricultural household model, such characteristics

enhance households' ability to translate financial inputs, including credit, into improved welfare outcomes.

Table 2: Distribution of Respondents by Sex, Age, Marital Status, Educational Status and Household Income, n = 192

Variables	Frequency	Percentage	Mean (Standard Deviation)
Gender of Household Heads			
Male	168	87.5	
Female	24	12.5	
Total	192	100.0	
Age of Household Head (Years)			
≤ 30	26	13.5	
31 – 40	63	32.8	
41 – 50	57	29.7	43.30 ± 11.32
51 – 60	36	18.8	
> 60	10	5.2	
Total	192	100.0	
Marital Status			
Single	22	11.4	
Married	155	80.7	
Widow/widower	12	6.3	
Divorced	3	1.6	
Total	192	100.0	
Household Size			
1 – 4	63	32.8	
5 – 8	106	55.2	
9 – 12	19	9.9	6 ± 2.46
> 12	4	2.1	
Total	192	100.0	
Household Head Income (₦)			
≤ 20,000	108	56.3	
20,001 – 40,000	26	13.5	
40,001 – 60,000	19	9.9	
60,001 – 80,000	13	6.8	37,202.62 ±53,669.42
80,001 – 100,000	9	4.7	
> 100,000	17	8.9	
Total	192	100.0	

Source: Field Survey, 2025

Farm and Institutional Characteristics

As shown in Table 3, the mean farm size of 2.42 hectares confirms the predominance of smallholder farming. Small farm sizes imply limited economies of scale and heightened exposure to production risk, increasing reliance on external financial support.

Most households reported at least one extension contact during the production season and membership in social or cooperative groups. Within the sustainable livelihoods framework, these institutional linkages represent critical forms of social and institutional capital that complement financial capital. Extension services, in particular, are expected to enhance the productivity of credit use by

improving access to information and farm management practices.

Table 3: Distribution of Respondents by Household Size, Farm Size, Farming Experience, Off-Farm Activities and Extension Contacts, n=192

Variables	Frequency	Percentage	Mean (Standard Deviation)
Educational Status			
No Formal Education	12	6.3	
Primary Education	49	25.5	
Secondary Education	88	45.8	
Tertiary Education	43	22.4	
Total	192	100.0	
Farm Size (Hectares)			
≤ 1	59	30.7	
1.01 – 2	51	26.5	
2.01 – 3	36	18.8	2.42 ± 1.67
3.01 – 4	22	11.5	
> 4	24	12.5	
Total	192	100.0	
Farming Experience (Years)			
1 – 10	61	31.8	
11 – 20	93	48.4	16.01 ± 7.72
21 – 30	31	16.2	
> 30	7	3.6	
Total	192	100.0	
Off-Farm Activity			
Yes	133	69.3	
No	59	30.7	
Total	192	100.0	
Type of Off-Farm Activity*			
Agro processing	67	32.5	
Trading	57	27.7	
Artisanship and Craft	34	16.5	
Paid Job in public or private sector	40	19.4	
Others	8	3.9	
Total	206	100.0	
Extension Contact			
Yes	135	70.3	
No	57	29.7	
Total	192	100.0	
Member			
Membership of Social Group			
Yes	166	86.5	
No	26	13.5	
Total	192	100.0	

Source: Field Survey, 2025

*Multiple choices allowed

Sources of Credit Available to the Farming Households

Table 4 shows that farming households access credit from both formal and informal sources. Formal credit mainly from cooperatives, microfinance banks, and commercial banks accounts for a larger share of total credit used, while informal sources serve as supplementary financing mechanisms.

From a theoretical standpoint, formal credit is more likely to relax liquidity constraints in a manner consistent with the agricultural household model, as it is typically associated with larger loan sizes and structured repayment terms. Informal credit, although important for short-term coping, may be constrained in scale and thus less effective in supporting sustained food security.

Table 4: Sources of Credit Available to Farm Households

Source of Credit*	Frequency	Percentage
Formal Sources		
Commercial Bank	13	9.9
Microfinance Bank	23	17.6
Cooperative	45	34.3
Informal Sources		
Esusu (ROSCA)	24	18.3
Friends	10	7.6
Money lenders	16	12.2
Total	**131**	**100.0**

Source: Field Survey, 2025
*Multiple responses allowed

Average Amount Requested and Granted from the Different Credit Sources

Table 5 presents the average amount of credit requested and granted by farming households across different credit sources. The results show that commercial banks and cooperative societies provide relatively larger loan amounts compared to informal sources such as friends, relatives, and rotating savings groups. Within the agricultural household model, the size of credit accessed is critical because only sufficiently large loans can relax liquidity constraints to a level that enables productive investment and sustained household consumption. Smaller loans, even when easily accessible, may be inadequate to support meaningful improvements in food security.

The ratio of credit granted to credit requested indicates varying degrees of credit rationing across institutions. Informal lenders exhibit higher granting ratios, reflecting greater accessibility and lower screening requirements. However, the relatively small loan sizes associated with these sources suggest that accessibility does not necessarily translate into effective liquidity relaxation. In contrast, formal and semi-formal institutions exhibit moderate rationing but provide larger loan amounts, which are more likely to support both production and consumption smoothing.

From the perspective of consumption smoothing theory, these patterns imply that the observed positive effect of credit use on food security in the logit model is driven primarily by the aggregate amount of credit utilised, rather than the source per se. Households that are able to obtain larger amounts of credit regardless of source are better positioned to stabilise food consumption during income fluctuations. This reinforces the fact that credit use matters for food security, with institutional characteristics influencing the magnitude of credit accessed.

Table 5: Average Amount Requested and Granted from Different Credit Sources

Source of Credit	Amount Requested (₦)	Amount Granted (₦)	Ratio of Credit Requested to Credit Granted
Commercial Bank	157,692.30	146,153.80	0.93
Microfinance Bank	62,608.70	57,173.91	0.91
Cooperative	87,727.27	76,777.78	0.88
Esusu (ROSCA)	51,428.57	45,714.29	0.89
Friends/relatives	47,250.00	38,000.00	0.80
Money lenders	71,875.00	68,125.00	0.95

Source: Field Survey, 2025

Food Security Status of Farming Households

Table 6 indicates that 56.8% of the sampled households are food secure, with a higher incidence of food security among credit users compared to non-credit users. This pattern provides preliminary descriptive evidence in support of consumption smoothing theory, suggesting that access to financial resources enables households to stabilise food consumption. However, the persistence of food insecurity among a proportion of credit users implies that credit alone may be insufficient without complementary factors such as appropriate loan size, institutional support, and favourable household demographics.

Table 6: Food Security Status of Farming Households, n = 192

Food Security	Pooled		Credit Users		Non-Credit Users	
	Freq	Percentage	Freq	Percentage	Freq	Percentage
Food Secure	109	56.8	48	60.8	61	54.0
Food Insecure	83	43.2	31	39.2	52	46.0
Total	**192**	**100.0**	**79**	**100.0**	**113**	**100.0**
Per Capita daily Food Expenditure (₦)	109.22		112.82		106.70	
Food Security Line (₦)	72.81		75.22		71.13	

Source: Field Survey, 2025

Determinants of Food Security Status

The logit regression results (Table 7) show that household size and dependency ratio negatively and significantly influence food security, while farming experience, extension contact, and credit use exert positive effects. The model is jointly significant (LR $\chi^2 = 54.58$; $p < 0.01$), and the pseudo-R^2 of 0.208 indicates reasonable explanatory power for a cross-sectional household-level logit model, consistent with similar studies in the food security literature.Household size has a negative and statistically significant effect on food security at the 1% level. The marginal effect (−0.0898) indicates that an additional household member reduces the probability of being food secure by approximately 9 percentage points, holding other factors constant. This reflects increased consumption pressure within larger households (Wudil et al., 2023; Ogunniyi *et al.*, 2021).

Farming experience is positive and significant at the 10% level. The marginal effect suggests that an additional year of farming experience increases the probability of food security by about 1.1 percentage points. This likely reflects accumulated production knowledge, improved farm management skills, and better risk-coping strategies over time (Aliyu, 2023 and Oke et al., 2023). Extension contact is positive and significant at the 5% level. The marginal effect (0.0403) implies that an additional extension contact during the production season raises the probability of food security by approximately 4 percentage points. This result is consistent with the findings of Kehinde *et al.* (2021) and Adebisi et al. (2022). This underscores the role of information dissemination in improving farm productivity and household welfare.The dependency ratio exerts a strong negative effect on food security and is significant at the 1% level. A unit increase in the dependency ratio reduces the probability of food security by about 12 percentage points, indicating that households with a higher proportion of non-working members face greater food insecurity risks due to higher dependency burden occasioned by limited income earning capacity. This result is in confirmation with the findings of Delvaux and Paloma (2018) and Niles et al., 2020 who identified dependency ratio as a factor that negatively influence food security.

The amount of credit utilised has a positive and statistically significant effect on food security at the 5% level. Although the marginal effect appears numerically small due to the scale of the variable, the positive sign indicates that higher levels of credit utilisation increase the likelihood of household food security (Monirou and Lokonon, 2022). This finding supports the argument that credit enhances productive capacity and consumption smoothing, thereby improving food security outcomes as opined by Ogunniyi *et al*. (2021) and Ademola et al. (2021).

Table 7: Logit Model Estimation of Determinants of Food Security Status, n = 192

Variables	Coefficient	Standard Error	Z	Marginal Effect
Age of Household Head (Years)	-0.001	0.018	-0.03	-0.0001
Gender of Household Head	0.233	0.504	0.46	0.0571
Household Size (No:)	-0.372***	0.093	-4.01	-0.0898
Marital Status	-0.460	0.438	-1.05	-0.1077
Farming Experience (Years)	0.045*	0.024	1.91	0.0111
Years of Education of Household Head	-0.026	0.038	-0.68	-0.0063
Farm Size (Ha)	-0.047	0.106	-0.45	-0.0115
Extension Contact (No: of Contact)	0.167**	0.080	2.07	0.0403
Membership of Cooperative Society	0.251	0.359	0.70	0.0604
Dependency Ratio	-0.511***	0.188	-2.72	-0.1235
Income	3.87e-06	4.86e-06	0.80	9.36e-07
Amount of Credit	1.56e-06**	0.000	2.52	1.56e-06
Constant	3.457	1.179	2.93	
Pseudo R^2	0.2082			
Likelihood Ratio Chi-square	54.58			
Prob > Chi^2	0.0000			
Log likelihood	-103.7475			

Source: Field Survey, 2025

*,**,*** represents 10%, 5% and 1% level of significance respectively

CONCLUSION AND RECOMMENDATION

This study analysed the effect of credit use on household food security among farming households in Ogun State, Nigeria, using a logit regression framework. The results show that a substantial proportion of farming households remain food insecure, underscoring the vulnerability of rural livelihoods despite engagement in agricultural production. Empirical evidence indicates that credit use significantly increases the likelihood of household food security. This finding provides direct support for consumption smoothing theory, which predicts that access to financial resources enables households to stabilise food consumption in the presence of income and production shocks. Within the agricultural household model, the positive effect of credit suggests that relaxing liquidity constraints improves households' capacity to balance production and consumption decisions, thereby enhancing welfare outcomes. The positive influence of farming experience and extension contact highlights the role of human and institutional capital in determining food security. These findings align with the sustainable livelihoods framework, which emphasises that financial capital yields greater welfare benefits when complemented by other forms of capital. In contrast, the negative effects of household size and dependency ratio reflect demographic pressure as a key vulnerability factor that constrains household food security, even in the presence of credit access.

The study recommends that since credit use significantly improves food security, credit interventions should prioritise loan sizes and repayment structures that align with agricultural production cycles. Additionally, the positive role of extension contact suggests that credit is more effective when combined with advisory and information services. As such integrating agricultural credit programmes with extension delivery can improve the productive and welfare-enhancing use of credit. It is also important to note that given the significance of farming experience, policies aimed at improving farmers' technical and financial management skills can enhance the welfare impact of credit, as predicted by the agricultural household model. The negative influence of household size and dependency ratio indicates that demographic pressure limits food security gains. Complementary interventions such as livelihood diversification and household-level welfare support are therefore necessary to address structural vulnerability.

Overall, the results confirm that credit is a necessary but not sufficient condition for achieving food security among farming households. Its effectiveness depends on complementary institutional support and household characteristics.

REFERENCES

Adebisi, L. O., Adebisi, O. A., Jonathan, A., Oludare, O. T., & Odum, E. E. B. (2022). Effect of Climate Smart Agricultural Practices on Food Security among Farming Households in Kwara State, North-Central Nigeria. *Pesquisa Agropecuária Tropical*, *52*, e70538. https://doi.org/10.1590/1983-40632022v5270538

Ademola, A., Isaac, A., & Adeleke, O. (2021). Determinants of Food Security Status and Coping Strategies to Food Insecurity among Rural Crop Farming Households in Ondo State, Nigeria. https://doi.org/10.9734/ejnfs/2021/v13i730435

Adesiyan, A. T., & Kehinde, A. D. (2024). Is there a LINKAGE between Credit Access, Land Use, and Crop Diversification in Achieving Food Security? Evidence from Cocoa-Producing Households in Nigeria. *Heliyon*, *10*(16). https://doi.org/10.1016/j.heliyon.2024.e35844

Adewale, C. I., & Belewu, K. Y. (2022). Economic analysis of snail production and its contribution to food security of farming households in Nigeria. Agricultura Tropica et Subtropica, 55. https://doi.org/10.2478/ats-2022-0017

Adeyeye, O. O. (2025). The Impact of Rural Credit on Smallholder Productivity and Welfare in Developing Economies. *Available at SSRN 5722523*. https://doi.org/10.2139/ssrn.5722523

Adigun, G. T. (2022). Determinants of Credit Access among Smallholder Women Farmers in Kwara State, Nigeria. Nigeria Agricultural Journal, 53(2), 121-128.

Akerele, D., Adekunle, C. P., Sanusi, R. A., Alarima, C. I. & Aromolaran, A. K. (2016). Influence of Urban Agriculture on Household Food Insecurity in an Urbanizing Area of Ekiti State. *Nigerian Journal of Agriculture, Food and Environment* 12(3): 56-62

Aliyu, A. A. (2023). Analysis of Food Security Status among Rural Farming Households in Mubi North Local Government Area of Adamawa State, Nigeria. *International Journal of Research-Granthaalayah*. https://doi.org/10.29121/granthaalayah.v7.i7.2019.757

Bonuedi, I., Kornher, L., & Gerber, N. (2022). Agricultural Seasonality, Market Access, and Food Security in Sierra Leone. *Food Security*, *14*(2), 471-494. https://doi.org/10.1007/s12571-021-01242-z

Ehteshammajd, S., Omidi Najafabadi, M., Lashgarara, F., & Mirdamadi, S. M. (2023). Assessing Rural Household Food Security using Sustainable Livelihoods Framework in Western Iran. *Agricultural Research*, *12*(2), 232-246. https://doi.org/10.1007/s40003-022-00640-9

Food & Agriculture Organization (Ed.). (2019). The State of Food Security and Nutrition in the World 2018. In The State of Food Security and Nutrition in

the World. Food and Agriculture Organization. https://doi.org/10.18356/c94f150c-en

Greene, W. (2003). Econometric Analysis, New Jersey: Prentice Hall.

Gujarati, D. N., (1998). Basic Econometrics, McGraw hill, New York, 98-102.

LaFave, D., Peet, E., & Thomas, D. (2025). Farm Profits, Prices and Household Behaviour. *Journal of Development Economics*, *174*, 103423. https://doi.org/10.1016/j.jdeveco.2024.103423

Lemecha, M. E. (2023). Credit Constraint and Agricultural Technology Adoptions: Evidence from Ethiopia. *Agricultural Finance Review*, *83*(3), 395-415. https://doi.org/10.1108/afr-06-2022-0075

Magubane, K., & Mothibi, L. (2025). The Impact of Credit and Debt Shocks on Household Consumption in South Africa. *International Journal of Research in Business and Social Science*, *14*(7), 268-283. https://doi.org/10.20525/ijrbs.v14i7.4394

Mounirou, I., & Lokonon, B. O. (2022). Can Micro-Credit Improve Food Security? Evidence from Benin-West Africa. *The Journal of Developing Areas*, *56*(2), 155-167. https://doi.org/10.1353/jda.2022.0021

Mounirou, I., & Lokonon, B. O. (2022). Can Micro-Credit Improve Food Security? Evidence from Benin-West Africa. *The Journal of Developing Areas*, *56*(2), 155-167. https://doi.org/10.1353/jda.2022.0021

Niles, M. T., Bertmann, F., Belarmino, E. H., Wentworth, T., Biehl, E., & Neff, R. (2020). The Early Food Insecurity Impacts of Covid-19. Nutrients, 12(7), 1–23. https://doi.org/10.3390/nu12072096

Odunsi, O. M., Onanuga, M. Y., & Obaitor, O. S. (2024). The New Millennium so Far: Analysing Land Cover Change in Ogun State Nigeria. *Journal of Contemporary African Studies*, *42*(4), 612-627. https://doi.org/10.1080/02589001.2024.2365633

Ogunniyi, A. I., Omotoso, S. O., Salman, K. K., Omotayo, A. O., Olagunju, K. O., & Aremu, A. O. (2021). Socio-Economic Drivers of Food Security among Rural Households in Nigeria: Evidence from Smallholder Maize Farmers. *Social Indicators Research*, *155*(2), 583-599. https://doi.org/10.1007/s11205-020-02590-7

Oke, F. O., Kareem, I. A., Bamigbade-Sanni, S. A., Akerele, D., & Oose, M. O. (2023). Impact Assessment of Cooperatives on Food Security among Catfish Farming Households in Oyo State, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, *23*(4), 23081-23098. https://doi.org/10.18697/ajfand.119.21765

Okunlola, O. C., & Ayetigbo, O. A. (2024). Impact of Agricultural Financing on Agricultural Growth Sustainability in Nigeria. *The Journal of Developing Areas*, *58*(3), 171-203. https://doi.org/10.1353/jda.2024.a929946

Olumba, C. C., Olumba, C. N., & Okpara, U. (2023). Household Headship, Resource Ownership and Food Security: New Evidence from Southeast Nigerian cities. Scientific African, 22, e01974. https://doi.org/10.1016/j.sciaf.2023.e01974

Rasheed, S., Tabasam, N., Anwar, J., & Jabeen, S. (2024). Impact of Credit on Agriculture Production in Pakistan: A Review. *European Journal of Ecology, Biology and Agriculture*, *1*(1), 3-13. https://doi.org/10.59324/ejeba.2024.1(1).01

Shah, M. H., Aktar, S. N., Pramanik, K., Pande, C. B., & Ali, G. T. (2024). The Impact of Climate Change on Plant Diseases and Food Security. In *Biocontrol Agents for Improved Agriculture* (pp. 353-384). Academic Press. DOI: https://doi.org/10.1016/B978-0-443-15199-6.00002-6

Strauss, John (1984) : An Overview of Agricultural Household Models: Theory, Center Discussion Paper, No. 450, Yale University, Economic Growth Center, New Haven, CT https://hdl.handle.net/10419/160374

Wudil, A. H., Ali, A., Aderinoye-Abdulwahab, S., Raza, H. A., Mehmood, H. Z., & Sannoh, A. B. (2023). Determinants of Food Security in Nigeria: Empirical Evidence from Beneficiaries and Non-Beneficiaries Rice Farmers of the Kano River Irrigation Project. *Frontiers in Sustainable Food Systems*, *7*, 999932. https://doi.org/10.3389/fsufs.2023.999932