ENHANCING RURAL FOOD PRODUCTION AND LIVELIHOODS THROUGH RESILIENT, SUSTAINABLE FARMING, AND INNOVATIVE AGRICULTURAL SYSTEMS

PROCEEDINGS

of the

34th ANNUAL NATIONAL *Congress*

of the

RURAL SOCIOLOGICAL ASSOCIATION OF NIGERIA (RuSAN)

held at

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

Between the 6th and 10th October 2025

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GENERAL INFORMATION

The Nigerian Rural Sociological Association (NRSA) was formed on January 7, 1981. Its inaugural congress was held from November 7 to 11, 1983 with the theme "Agriculture and Social Development in Nigeria".

NRSA is a broad-based professional association with membership cutting across universities, agricultural research institutes and other agricultural/rural development agencies both from the public and private sectors. Membership is open to all professionals who are interested in advancing the development of the rural folks.

This volume is the proceeding of the **34th Annual National Congress** held at the **University of Ibadan, Ibadan, Nigeria** between **6th and 10th October 2025**. The plenary papers contained herein were reviewed before this publication.

The association gratefully acknowledges the moral and financial contributions of many organisations and individuals to the success of the congress.

Year	Theme	Editor-in-Chief	Venue/Location
2025	Enhancing Rural Food Production and Livelihoods through Resilient, Sustainable Farming, and Innovative Agricultural Systems	Prof Taofeeq Yekinni	University of Ibadan, Ibadan, Nigeria
2024	Nigerian Economy and Rural Livelihoods: Opportunities and Resilience	Prof John Oladeji	University of Ilorin, Ilorin, Kwara State
2023	Contemporary sociological contexts of the Nigerian food system	Prof John Oladeji	Usmanu Danfodiyo University, Sokoto
2022	Poverty, governance, and social values in rural context	Prof John Oladeji	Federal University, Oye-Ekiti
2021	Transforming rural environment: The sociological perspective	Prof John Oladeji	Ogun State
2020	Emancipation of the Rural Family in Contemporary Nigeria	Prof. Kolawole Adebayo	Landmark University, Omu Aran, Kwara State
2019	Transforming Nigeria's Rural Environment: The Sociological Perspective	Prof. Kolawole Adebayo	Obafemi Awolowo University, Ile-Ife
2018	Rural Social Fortification and Development in Nigeria	Prof. Kolawole Adebayo	Ahmadu Bello University, Zaria
2017	Grassroots Development and Dividend of Democracy	Prof. Kolawole Adebayo	Michael Okpara University of Agriculture, Umudike

Year	Theme	Editor-in-Chief	Venue/Location
2016	Conflict, Peace Building and Rural Development	Prof. F. A. Kuponiyi	Federal University of Oye-Ekiti, Oye-Ekiti
2015	Changing Social Values, Transparency and Sharp Practices – Impacts on Agricultural and Rural Development	Prof. F. A. Kuponiyi	Ladoke Akintola University of Technology, Ogbomoso
2014	Social Engineering on Sustainability of the Agricultural Transformation Agenda	Prof. F. A. Kuponiyi	University of Benin, Benin
2013	Perspectives on changing rural social organisations, structures and institutions and implications for agricultural development strategies in sub-Saharan Africa	Prof. F. A. Kuponiyi	University of Uyo, Uyo
2012	Challenges and Approaches to Sustainable Rural Development in sub-Saharan Africa	Prof. F. A. Kuponiyi	University of Ibadan, Ibadan
2011	Socioeconomic Analysis of Entrepreneurial Education Food Security Poverty Alleviation Linkages in Nigeria	Prof. F. A. Kuponiyi	Fed Coll of Agric Produce Tech, Hotoro, Kano
2010	Approaches towards the Transformation of Rural and Agricultural Economy in Nigeria	Prof. A. A. Ladele	University of Agriculture, Makurdi
2009	Globalization of the Socio-Political Economy of Rural Development	Dr A. A. Ladele	Akure
2008	Policy Advocacy Role in Agricultural and Rural Transformation in Nigeria	Dr A. A. Ladele	Umudike
2007	Powering Agricultural Rural Transformation Process in Nigeria.	Dr A. A. Ladele	BOWEN, Iwo
2006	Unlocking the Agricultural and Rural Potentials of Nigeria	Dr A. A. Ladele	UNAD, Ado-Ekiti
2005	Promoting Rural and National Economic Transformation through Agricultural Revolution	Prof. A. A. Jibowo	OOU, Ago-Iwoye

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ENHANCING RURAL FOOD PRODUCTION AND LIVELIHOODS THROUGH RESILIENT FARMING SYSTEMS FOR ECONOMIC GROWTH AND DEVELOPMENT

Attanda, M. L.

Being the keynote address delivered at the 34th Annual National Congress of the Rural Sociological Association of Nigeria (RuSAN), held at University of Ibadan, Ibadan, Nigeria, between 6 and 10th October 2025

Protocols

I am both delighted and honoured to be invited to speak on the theme of the congress "Enhancing Rural Food Production and Livelihoods through Resilient Farming Systems for Economic Growth and Development". The theme is important, given the country's comparative advantage and competitiveness in a wide range of agricultural commodities. The role of rural food production is critical for achieving food security, generating income, employment, and supporting sustainable livelihoods, as food remains one of the most basic necessities of life. Hence, rural agriculture can be said to be a cornerstone of the national economic growth. I am pleased that this topic is being discussed at this particular congress, where we have experts capable of providing evidence-based insights to guide policy decisions related to rural food production for national economic growth and development in our country.

INTRODUCTION

Agriculture is vital to Nigeria's economy, contributing significantly between 23-26% to Nigeria's Gross Domestic Product and about 25.59% of the non-oil sector's 95% contribution to the nation's economic growth in the recent quarters.

Nigeria has a total agricultural land area of 70.8 million hectares, of which 34 million hectares are arable land, 6.5 million hectares are used for permanent crops, and 30.3 million hectares are meadows and pastures. The country has one of the largest expanses of land in Africa, with more than 900 thousand square kilometers, and 70 percent of it is able to be cultivated to produce sustenance for the population of Nigeria.

Smallholder farmers in Nigeria produce 80 percent of the total food consumed in the country. Rural food production is important in Nigeria, as it forms the backbone of the country's food supply, with smallholder farmers producing about 90% of agricultural produce.

Rural dominance in food production in Nigeria underscores the need to give rural regions critical national attention in resilient farming systems research, technology development, dissemination, and adoption.

Improving rural food production is essential to enhance food availability, provide employment, reduce hunger, and promote sustainable rural development.

Challenges such as poor rural infrastructure, limited access to modern farming technologies, and appropriate mechanization affect food production efficiency. Addressing these challenges can boost productivity, increase incomes, and strengthen food systems in Nigeria.

General overview of resilient farming systems in Nigeria

Farming systems encompass all components of a farm enterprise, cropping systems, livestock managed by several farmers in a community, and off-farm activities within a framework of markets for land, labour, production inputs, farm products, credit, and knowledge (Fairhurst, 2012).

Farming systems in Nigeria involve diverse cropping systems, including monocropping, mixed cropping, multiple cropping, mixed farming, and intensive animal production. Nigeria's farming system is dominated by smallholders.

A resilient farming system is one that can absorb shocks (climate variability, market fluctuations, pest/disease outbreaks, policy changes) and still function, adapt, and recover without long-term damage. It usually involves practices such as crop and livestock diversification, climate-smart agriculture (CSA), soil and water conservation, integrated pest management, and use of local knowledge with modern innovations.

While farmers' livelihood refers to the means of securing food, income, and well-being. This includes farm productivity and profitability, household food security, access to markets and resources, social safety nets and community support, and the ability to invest in health, education, and future opportunities.

The level of smallholder farmers' participation in resilient farming practices depends on their knowledge level, degree of adoption of the recommended practices, access to information, resources and competitive markets entry requirements, amongst other factors.

The Federal Government of Nigeria and many state governments have demonstrated support and involvement in resilient farming over the years through policies and investment in various components of the resilient farming system.

Many Programmes and activities of private entities that are spin-offs of development partners and co-operations have also demonstrated efforts to promote resilient farming systems in Nigeria.

However, continued collaboration among the government, private entities, farmers, and, most importantly, the key actors in the value chains of

resilient agricultural technologies and practices (i.e., the scientists & experts present today) is essential for advancing and scaling up resilient farming systems in Nigeria for sustainable farmer livelihoods and national economic growth.

Nexus between resilient farming systems and farmers' livelihood: Integral of what we do at NIHORT

The crop sector is one of the major contributors to agricultural development in Nigeria. This sector grew by 2.82% in the second quarter of 2025 as part of non-oil sector and this is an improvement compared to the 2.60% growth in the second quarter of 2024. The positive performance in agriculture and other non-oil sectors supports the overall resilience and growth of the Nigerian economy.

National Horticultural Research Institute is a crop-based research institute with the mandate to conduct research into genetic improvement, production technologies, processing, storage, utilisation, and marketing of fruits, vegetables, spices, other medicinal and aromatic plants of nutritional and economic importance. The Institute has developed many technologies to promote resilience in the horticultural value chains and is continually coming up with more technologies that would launch the country into self-sufficiency in horticulture.

Resilient farming systems and farmers' livelihoods are deeply interconnected and form a core focus of our work at NIHORT. The following are some of the lessons learnt on the field with farmers:

Risk reduction: Resilient farming systems minimize the risks of crop failure caused by droughts, pests, or market fluctuations, thereby stabilizing farmers' incomes and reducing vulnerability to poverty cycles. In this regard, NIHORT developed, registered and released to farmers several vegetable seeds, such as okra, amaranth, and five series of tomato varieties that are disease resistant, rainfall tolerant, early maturing, and high yielding (up to 63 tonnes/ha compared to the previous 5-10 tonnes/ha). Shelf life of up to 15 days after harvest, reducing risk of post-harvest losses.

Sustainable resource use: Resilient practices such as soil conservation and health, water harvesting, and pest and disease management practices ensure farmers' productivity across generations. NIHORT, in its efforts to ensure sustainable resource use, developed improved pest and disease management technologies, through the use of pheromones, *Tuta* Trap Trays, and biopesticides for safe control of pests on tomato, pepper, and other horticultural crops. These technologies are organically produced from local materials and are already patented under federal government law. The institute has produced compost, mushrooms, silage, and soap from horticultural wastes, promoting efficient resource utilisation. Through its Farming Systems Programme, the institute has developed water management systems for horticultural crops to mitigate the impacts of climate change, and an integrated farming systems approach where components are interconnected, maximizing resource use with zero waste. Additionally, the institute has developed intercropping models for citrus, plantain, pawpaw, and mango to further enhance sustainable resource use in agricultural value chains.

Diversification: Diversification is an important strategy in resilient farming systems. Diversified farming cushions risks in farming enterprises and promotes multiple income streams. Farmers can sell raw produce and also add value to agricultural commodities to minimize risks along the value chain and enhance livelihood security. The National Horticultural Research Institute has developed an array of value-added products to extend the shelf life of horticultural crops, increase income, and improve the sustainability of farming enterprises thereby boosting farmers' livelihoods and ensuring a year-round supply of horticultural crops. The value-added products developed include juices from pineapple, citrus, mango, fruit candy, jam, and dried fruit slices. Value-added products developed from tomatoes include dried tomato slices, tomato powder, whole peeled tomatoes, and puree. Other innovations include mango flakes and leather, essential oil from ornamental plants, onion paste and flakes, herbal and antioxidant teas.

Adaptive capacity: Farmers use resilient farming systems to develop skills, build networks, and create adaptive strategies that enhance their capacity to cope with shocks and invest in future livelihood opportunities. For instance, the Tomato and Orchard Producers Association of Nigeria currently utilises NIHORT developed, registered and released tomato varieties as an adaptive strategy to build resilience against tomato shortages, especially during the rainy season when market supply declines. NIHORT has trained youths on climate-resilient farming practices in fruit and leafy vegetable production in both lowland and upland areas through its Horticultural Academy for Youth programme. Through the programme, youth are trained for 6 months on resilience and adaptive strategies of leafy and fruit vegetable production. The Institute has completed training of 3 batches on the improved strategies, with most of the youths becoming active participants in horticulture value chains.

Market and policy linkages: Resilient systems often align with sustainable value chains and climate-friendly policies. This improves farmers' bargaining power, access to subsidies, and entry into

premium markets (e.g., organic, fair trade). Empowerment is very crucial in establishing sustainable market linkages within the agricultural value chain. In this regard, NIHORT on the 17th March, 2025 hosted 22 Dutch business and indigenous business players along with farmers involved in the horticultural value chain at our Ibadan premises. This initiative created a platform for market linkages and policy advocacy through meaningful interactions. Similarly, NIHORT is building capacity of stakeholders in horticultural value chains across Lagos, Badagry, Oyo, Osun, Ondo, Ekiti, Kano, Benue to further promote market linkages. These efforts have improved farmers' bargaining power, improved access to subsidies and premium markets and supported policy advocacy with the government.

Call to actions to scale up resilient farming systems for enhanced rural food production and farmers' livelihoods

Dear colleagues at this esteemed congress, I trust that finding sustainable pathways to address the following seven (7) calls to action, along with others, in scaling up the status of resilient farming practices in our country will be our preoccupation/concern during the next three days of this gathering.

Strengthen climate-smart and resilient agricultural practices to boost productivity, reduce vulnerability to droughts, floods, disease, and pests, and ensure year-round food and income security.

Support for research, innovation, and technology adoption to increase productivity and enable evidence-based decision-making for sustainability and economic growth.

Improve access to agricultural finance and insurance to strengthen farmers' capacity to invest, recover from shocks, and maintain sustainable livelihoods.

Investment in rural infrastructure and market access to increase farmers' income, reduce waste, and enhance overall rural economic resilience.

Strengthen agricultural extension services and capacity building programmes to develop farmers' technical and entrepreneurial skills, improving productivity and self-reliance.

Scale up appropriate technology for agricultural mechanization and adoption to improve farming productivity and profitability with optimal resources for economic growth.

Strengthen policy frameworks and institutional coordination to ensure that interventions are sustainable, evidence-based, and scaled effectively across rural areas.

Concluding remarks

Resilient farming systems are the foundation of sustainable farmers' livelihoods. They help farmers withstand shocks, secure food, stabilize income, and preserve resources, which collectively enhance their long-term well-being and reduce poverty risks.

I wish the audience a productive discussion and encourage this gathering to explore innovative ways to advance resilient farming systems to the next level. This is crucial to enhance smallholder farmers' involvement in food production, therefore improving food security and the livelihood of the nation.

Ladies and Gentlemen, I want to appreciate the association for the opportunity. Thank you all!

OCCUPATIONAL HAZARDS AND SAFETY MEASURES IN CASSAVA PRODUCTION AND PROCESSING IN NIGERIA: A COMPARATIVE STUDY

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ABSTRACT

Cassava production and processing are central to Nigeria's food security and rural livelihoods but expose workers to multiple occupational hazards. This study compared the prevalence and severity of occupational hazards and safety measures among cassava producers and processors in Akwa Ibom and Oyo States. Anchored on the Hazard Prevention Framework, a quantitative, comparative survey of 310 respondents (200 in Akwa Ibom; 110 in Oyo) was conducted using multi-stage sampling and structured questionnaires. Analytical tools included descriptive statistics, correlation, and multiple regression analyses. Major hazards reported were stress and fatigue (92%), insect bites and stings (84%), and heat stress or dehydration (81%). Significant determinants of hazard prevalence were sex and household size ($p < 0.05$). The severity of hazards was negatively correlated with economic impacts ($r = –0.088$, $p > 0.05$) but showed a positive, significant relationship with sociocultural impacts ($r = 0.510$, $p < 0.01$). Although first-aid facilities and PPE use were common, institutional safety regulations were weak. The study recommends regular safety training, stricter PPE enforcement, improved occupational health services, and gender-responsive interventions to enhance cassava workers' wellbeing.

Keywords: Occupational hazards, safety measures, cassava production, cassava processing

INTRODUCTION

Cassava contributes significantly to food security, employment, and industrial development in Nigeria (Ekanem *et al.*, 2023). However, cassava producers and processors face diverse occupational risks, stress, fatigue, respiratory problems, and exposure to chemicals (Oduwaiye *et al.*, 2015). These hazards compromise productivity and worker health (Ajala *et al.*, 2022). Existing studies highlight risks in single regions but have limited comparative analyses across states.

This study bridges that gap by comparing Akwa Ibom and Oyo States, focusing on hazard prevalence, safety practices, and the role of socio-economic factors. The specific objectives were to identify occupational hazards, assess hazard prevalence, and identify safety measures.

Hypotheses tested were:

H_o1: There is no significant relationship between socio-economic characteristics and hazard prevalence.

H_o2: No significant relationship exists between hazard severity and the socio-economic impacts of hazards.

METHODOLOGY

A comparative survey design was employed in Akwa Ibom and Oyo States. Respondents were selected through multi-stage sampling (n = 310: Akwa Ibom = 200; Oyo = 110). Data were collected using structured questionnaires and analysed with descriptive statistics, correlation, and multiple regression models. The regression model is expressed as

$$Y = \beta_0 + \beta_{1X_1} + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$$

Where Y = hazard prevalence/severity, $X_1 - X_4$ = socio-economic characteristics (sex, age, education, household size).

RESULTS AND DISCUSSION

Occupational Hazards

The most prevalent hazards (Table 1) were stress and fatigue (92%), insect bites and stings (84%), and heat stress (81%). Noise-induced hearing loss and chemical exposure were less common (≈58%).

Table 1: Occupational hazards faced by respondents in Akwa Ibom and Oyo States

Occupational Hazard	Total % (n=310)	Akwa Ibom % (n=200)	Oyo % (n=110)	χ^2	*p*-value
Skin irritation or rashes	66.1	72.5	54.5	8.76	0.003 **
Cuts or lacerations	66.1	72.5	54.5	8.76	0.003 **
Burns or scalds	62.9	70.0	50.0	10.45	0.001 **
Exposure to hazardous chemicals	58.1	65.0	45.5	9.32	0.002 **
Noise-induced hearing loss	58.1	65.0	45.5	9.32	0.002 **
Heat stress/dehydration	81.0	80.0	81.8	0.16	0.690 ns
Insect bites and stings	84.0	82.5	90.9	5.19	0.023 *
Stress and fatigue	92.0	87.5	100.0	14.66	<0.001 **

χ^2 = Chi-square test of independence. $p < 0.05$ = significant. $p < 0.01$ = highly significant, ns = not significant.
Source: Field survey (2024)

Akwa Ibom recorded higher reports of chemical exposure (65%) than Oyo (45%), while Oyo showed higher fatigue (100%). These variations indicate that mechanization and work intensity differ between states. Fatigue and insect bites dominate due to long hours, outdoor work, and poor ergonomics (Adepoju *et al*., 2019).

Prevalence levels of hazards

Mean scores (Table 2) show high prevalence for stress ($\bar{x}$ = 1.98) and heat stress ($\bar{x}$ = 1.96). No significant state-level difference ($p > 0.05$) was observed, implying shared risk exposure patterns. This aligns with Ewebiyi *et al*. (2020) and Oduwaiye *et al.* (2015), who found that cassava processing hazards are similar across Nigeria.

Table 2. Level of prevalence of occupational hazards among respondents in Akwa Ibom and Oyo States

Occupational Hazard	Total (n=310) $\bar{x}$ ± SD	Akwa Ibom (n=200) $\bar{x}$ ± SD	Oyo (n=110) $\bar{x}$ ± SD	*t*-test	*p*-value
Skin irritation or rashes	1.68 ± 0.62	1.70 ± 0.61	1.65 ± 0.63	0.59	0.56 ns
Cuts or lacerations	1.80 ± 0.65	1.82 ± 0.65	1.78 ± 0.66	0.42	0.67 ns
Exposure to hazardous chemicals	1.74 ± 0.63	1.76 ± 0.63	1.72 ± 0.64	0.44	0.66 ns
Heat stress/dehydration	1.96 ± 0.60	1.97 ± 0.60	1.95 ± 0.61	0.33	0.74 ns
Insect bites and stings	1.94 ± 0.61	1.93 ± 0.61	1.95 ± 0.62	0.28	0.78 ns
Stress and fatigue	1.98 ± 0.59	1.96 ± 0.59	2.00 ± 0.60	0.41	0.68 ns

Ratings were based on a 3-point Likert scale (High = 3, Medium = 2, Low = 1). $p < 0.05$ indicates a statistically significant difference between the states; ns = not significant.
Source: Field survey (2024)

Safety measures

Most respondents adopted first-aid (85.8%), PPE use (85.2%), and rest breaks (78.1%) (Table 3). Institutional measures like regulation and incident reporting were weak. This pattern reflects self-managed safety rather than policy-driven enforcement, consistent with Afube *et al.* (2019) and Sehsah *et al*. (2020).

Table 3. Safety measures and regulations adopted in mitigating occupational hazards in Akwa Ibom and Oyo States

Safety Measure	Total % (n=310)	Akwa Ibom % (n=200)	Oyo % (n=110)	χ^2	*p*-value
Use of personal protective equipment (PPE)	264 (85.2)	170 (85.0)	94 (85.5)	0.01	0.94 ns
Participation in safety training/awareness	175 (56.5)	115 (57.5)	60 (54.5)	0.23	0.63 ns
Government regulations and enforcement	130 (41.9)	85 (42.5)	45 (40.9)	0.07	0.79 ns
Availability of first-aid facilities	266 (85.8)	172 (86.0)	94 (85.5)	0.01	0.92 ns
Provision of adequate breaks and rest periods	242 (78.1)	156 (78.0)	86 (78.2)	0.00	0.97 ns

χ^2 = Chi-square test of independence. $p < 0.05$ indicates statistically significant difference between states; ns = not significant.
Source: field survey (2024)

Testing of Hypotheses

Socioeconomic predictors of hazard prevalence

Regression analysis (Table 4) identified sex and household size as significant predictors of hazard prevalence ($p < 0.05$), with $R^2 = 0.182$. These factors were also significant in individual state models. The result supports Ifeanyi-Obi and Uloh (2025), showing that gendered work roles and family labor patterns influence risk exposure.

Table 4: Multiple regression of selected socioeconomic characteristics on the prevalence/severity of occupational hazards

Variable	Total (n=310) β (p-value)	Akwa Ibom (n=200) β (p-value)	Oyo (n=110) β (p-value)
Sex	0.215 (0.009**)	0.228 (0.014*)	0.204 (0.058)
Age	0.072 (0.185)	0.081 (0.179)	0.066 (0.360)
Level of Education	-0.058 (0.240)	-0.061 (0.269)	-0.052 (0.408)
Household Size	0.198 (0.011*)	0.202 (0.016*)	0.194 (0.037*)
R^2	0.182	0.176	0.189
F-value	4.29 (p<0.01)	3.82 (p<0.01)	3.14 (p<0.05)

*p < 0.05, **p < 0.01. NS = Not significant.*

Relationship between hazard severity and impacts

Correlation results (Table 5) show a weak, non-significant negative relationship between hazard severity and economic impacts ($r = -0.088$; $p > 0.05$), consistent across both states. This suggests that while health risks exist, households mitigate income loss through adaptive labour sharing (Ndubueze-Ogaraku *et al*., 2020). However, hidden costs such as medical expenses and reduced efficiency remain.

Table 5: Correlation between prevalence/severity levels of hazards and economic impacts of cassava processing

Variables	Total (n=310) r (p-value)	Akwa Ibom (n=200) r (p-value)	Oyo (n=110) r (p-value)
Severity of hazards and Economic impacts	-0.088 (0.174) NS	-0.075 (0.228) NS	-0.095 (0.316) NS

r = Pearson correlation coefficient. NS = Not significant (p > 0.05).

By contrast, hazard severity was significantly and positively correlated with sociocultural impacts ($r = 0.510$; $p < 0.01$) as shown in Table 6, indicating that severe hazards disrupt family relations and social participation. Similar findings in Rivers State confirm that occupational hazards extend beyond physical health, affecting community stability and well-being (Ndubueze-Ogaraku *et al*., 2020).

Table 6: Correlation between Prevalence/Severity Levels of Hazards and Sociocultural Impacts of Cassava Processing

Variables	Total (n = 310) r (p-value)	Akwa Ibom (n = 200) r (p-value)	Oyo (n = 110) r (p-value)
Severity of hazards and Sociocultural impacts	0.510 (0.000**)	0.495 (0.000**)	0.533 (0.000**)

r = Pearson correlation coefficient. $p < 0.05$ = Significant.

CONCLUSION AND RECOMMENDATIONS

Cassava producers and processors in Akwa Ibom and Oyo States face high levels of occupational hazards, especially fatigue, insect bites, and heat stress. Safety practices are largely personal rather than institutional. Hazard exposure is shaped by gender and household size, while sociocultural impacts outweigh short-term economic losses. Based on the findings, the following recommendations are made:

1. Organize regular safety training for cassava workers.
2. Enforce consistent use of PPE and first-aid provisions.
3. Strengthen occupational health regulations and rural health services.
4. Promote community-based occupational safety monitoring.

REFERENCES

Adepoju, J. O., Oladeebo, A. S., and Toromade, A. S. (2019). Analysis of occupational hazards and poverty profile among cassava processors in Oyo State, Nigeria. *Asian Journal ofAdvances in Agricultural Research, 9*(1), 1–13.

Afube, G. C., Nwaogazie, I. L., and Ugbebor, J. N. (2019). Assessment of hazards and safety practices in the food and beverage industry in Nigeria. *Journal of Engineering Research and Reports, 7*(2), 1–18.

Ajala, A. O., Ogunjimi, S. I., Alabi, O. O., Adebimpe, A. T., Adewumi, O. T., and Ojo, K. O. (2022). Assessment of occupational hazards among arable crop farmers in Irepodun Local Government, Kwara State, Nigeria. *FUOYE Journal of Agriculture and Human Ecology, 7*(2), 17–25.

Ekanem, J. T., Adesiji, G. B., and TomDick, B. (2023). Utilisation of pro-vitamin A cassava products by consumers in Ikot-Ekpene senatorial district of Akwa Ibom State, Nigeria. *SVU-International Journal of Agricultural Sciences, 5*(1), 46–56.

Ewebiyi, I. O., Odunuga, A. O., and Fowomola, T. D. (2020). Assessment of occupational hazards among cassava processors in Ifo LGA of Ogun State, Nigeria. *Journal of Environmental and Tourism Education, 3*(1), 1–12.

Ifeanyi-Obi, C. C., and Uloh, C. O. (2025). Gender differences in occupational health status among rural farming households in Akwa Ibom State, Nigeria: Evidence from the WHOQOL-BREF instrument. *International Journal of Agricultural Extension, Management and Development, 13*(2), 28–45.

Ndubueze-Ogaraku, M., Ezeala, O., and Omasanuwa, Z. (2020). Do occupational hazards affect the revenue earnings of cassava processors in Rivers State?

Advances in Social Sciences Research Journal, 7(4), 34–46.

Oduwaiye, M. O., Akangbe, J., and Komolafe, S. E. (2015). Perceived effects of occupational hazards on farmers' productivity in Kwara State, Nigeria. *International Journal of Occupational and Environmental Health, 3*(1), 45–53.

Sehsah, R., El-Gilany, A. H., and Ibrahim, A. M. (2020). Personal protective equipment (PPE) use and its relation to accidents among construction workers. *La Medicina del Lavoro, 111*(4), 285–295.

EXAMINING THE EFFECT OF BANK OF INDUSTRY LENDING ON THE PERFORMANCE OF SMALLHOLDER-RICE FARMERS IN AYAMELUM LGA, ANAMBRA STATE

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ABSTRACT
Although the extant literature is gorged with studies assessing the effects of banks' lending on the growth of micro, small and medium enterprises (MSMEs) in Nigeria, the impact of Bank of Industry (BOI) lending on the growth of MSMEs has not been well established. The primary objective of this study was to examine whether the BOI credits played an important role in promoting smallholder-rice farming in Ayamelum LGA. This objective is synergised with the Sustainable Development Goals (SDGs), particularly the SDG-8, which focuses on the achievement of decent work and economic growth. The study adopted survey design, using the Taro Yamane formula 1967 to arrive at a sample size of 60, which was derived from the population of 70 clusters of smallholder-rice farmers. The purposive sampling technique was used to administer questionnaires and interviews. Data collected were analysed using descriptive statistics and qualitative descriptive methods respectively. The results showed that the BOI micro-enterprise lending scheme did not enhance the performance of smallholder-rice farmers in Ayamelum LGA. This is because 94% of the respondents believed that the BOI did not support them and were faced with information and knowledge limitation on the operations of the bank. Factors such as lack of information and knowledge regarding the BOI loan terms and support services among the rice farmers in Ayamelum LGA, have been noted in this study. This has undermined the ability of rice farmers in the LGA to benefit from the BOI value-chain, thereby impeding their productivity levels.
Keywords: Bank of Industry, loans, enterprises, rice farmers, growth.

INTRODUCTION

This study was born out of the need to examine whether the BOI micro-enterprises lending scheme played a significant role in funding the smallholder rice farmers in Ayamelum LGA of Anambra State. The study is organized into different sections. Sections one and two introduced the study and the study area, while sections three and four dealt with methodology and data presentation. On the other hand, section five focused on the conclusion and recommendation.

Figure 1 is the map of the study area-Ayamelum LGA. The map provides a detailed representation of the Ayamelum LGA, showcasing its constituent towns and communities. Notably, five communities in the LGA renowned for their significant rice production capacities are highlighted in the map, namely: Omor, Omasi, Ifite-Ogwari, Umumbo and Umerum.

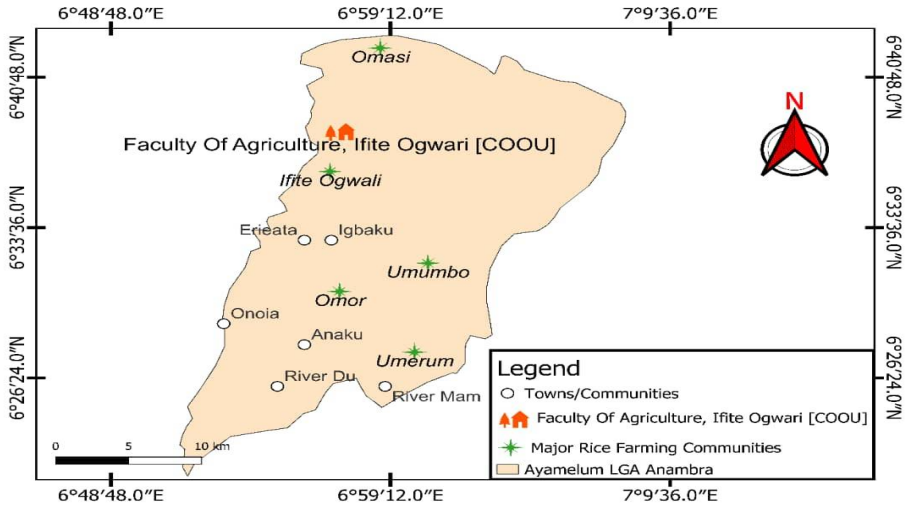

Figure 2.1: Map of Ayamelum LGA, Anambra State, Nigeria
Source: Author

METHODOLOGY

The study adopted survey designs to examine the effect of the BOI micro-enterprises lending on the performance of smallholder rice farmers in Ayamelum LGA of Anambra State. Questionnaires and interviews were employed to generate primary

data used in the test of hypothesis. Primary data was collected from the sample size of 60, which was derived from a population of 70 clusters of smallholder rice farmers in Ayamelum LGA of Anambra State. The Taro Yamane formula 1967 was used to arrive at the sample size from the above population.

With the purposive sampling technique, 60 copies of questionnaires were distributed on the gender identity basis (involving 25 females and 35 males) at various clusters of smallholder-rice farmers in the LGA. However, only 50 copies of the questionnaire were filled and returned. Using the purposive sampling technique, interviews with the representatives of various clusters (2 females and 10 males) and officials of the BOI at Awka office, were conducted. The quantitative and qualitative data were analysed with the aid of descriptive statistics and qualitative descriptive methods.

RESULT AND DISCUSSION

This section of the study focused on the presentation, description, analysis, and interpretation of field data generated from the population sample using questionnaires and interviews. The section is guided by the following subthemes:

- Data presentation and analysis of questionnaire results
- Analysis of interview results.

The first section collected the respondents' socio-demographic and biodata, while the second section related to the extent of awareness and contribution of BOI credits to the growth of smallholder-rice farming in Ayamelum LGA. Meanwhile, section three elicited information on the barriers faced by them in accessing the BOI loans, while section four of the questionnaire related to the general sources of funds and challenges faced by the rice farmers in the LGA. Specifically, the questionnaire results show that 94% of the respondents believed that the BOI did not support them, while 6% of them believed in contrary.

Analysis of interview results

In an attempt to uncover general trends or relevant insights and strengthen the survey results from the questionnaires, we interviewed some stakeholders of the smallholder-rice farming in Ayamelum LGA. These conversations aided the clarity of results obtained with questionnaires. The analysis of the interviews is structured thematically.

Table 4.2.1. Socio-demographic characteristics of IDI participants

Participant code	Gender	Age	Marital Status	Educational Qualification	Period operating on rice farming	Number of employee(s)	Location of rice farm
IDIOM1	M	55	M	No formal Education	22	3	Omor
IDIOM2	M	46	S	SSCE	10	1	Omor
IDIOM3	M	41	M	FIRST DREGREE	13	1	Omor
IDIOM4	M	50	M	FSLC	23	6	Omor
IDIOM5	M	38	S	FSLC	8	0	Omor
IDIOM6	F	45	M	FSLC	11	1	Omor
IDIIF1	M	45	M	HND	15	2	Ifite Ogwari
IDIIF2	M	39	M	SSCE	9	0	Ifite Ogwari
IDIIF3	M	50	M	No formal Education	26	4	Ifite Ogwari
IDIIF4	M	47	S	FSLC	11	3	Ifite Ogwari
IDIIF5	M	37	M	SSCE	7	1	Ifite Ogwari
IDIIF6	F	42	M	SSCE	6	0	Ifite Ogwari

Source: Survey 2024

Productivity of rice farming in Ayamelum LGA

The interviews with rice farmers reveal the lucrative nature of agriculture, rice farming in particular, at Ayamelum LGA. For instance, Mr. Peter, a local representative of several clusters of rice farmers, expressed optimism regarding the potential of rice farming to support many livelihoods and revenues for the government in the area. As he remarked:

As a farmer, I do other projects, but rice farming is my major occupation. My community, Omor is one of the largest rice farming hubs in West Africa. Because of the presence of Anambra-Imo River Basin Development Authority in my place, we have been into commercial agriculture for some years now. As a result, agriculture is supporting the livelihood of many in my locality. There is growth in agriculture and productivity output, making many people, both indigenes and strangers to engage in agriculture here. Many people do not want to go elsewhere for jobs because farming here provides them the opportunity to generate reasonable incomes to cater for themselves and their family members.

This sentiment is shared by other participants who feel that Ayamelum LGA has a prospect for large scale agriculture, especially rice farming. Another participant, Mr. Edochie, who hails from Ifite Ogwari community emphasized that:

Rice farming is highly lucrative but capital intensive. For one to venture into rice farming, there is need to make provisions for rice seedlings, herbicides, fertilizers and machines that will necessitate the land browsing. When all these things are in place, farming rice becomes profitable. All these require finances. Rice farming will give a farmer a bountiful harvest depending on what one invests in its cultivation.

Challenges facing rice farmers in Ayamelum LGA

Several participants agreed that lack of access to funds and agricultural lands are the major challenges confronting rice farmers in the area. For example, one of the leaders of Rice Clusters Union noted that:

Access to finance and land are twin problems plaguing rice cultivation in the LGA. Farmers are like entrepreneurs who need financial assistance and advisory support to enable them to expand their scope and capacity. With sufficient financial support, the productivity of rice farmers will increase. With financial support, we can rent more land for rice cultivation. Also, it is funding that determines the number of fertilizers, pesticides and quality of machines that we can purchase for rice production.

Lack of Access to BOI loans

Moreover, many rice farmers expressed deep concerns regarding the inaccessibility of BOI loans. For instance, some of the participants noted that the BOI is not committed to giving loans to the rice farmers in the LGA. For example, Mr. Nnonyelu, a member of the Rice Cooperative remarked that:

We hear about the BOI, but we have not benefited anything from them. Sometimes, officials of the BOI visit us and when they come, they often ask us to fill a form but in the end we 'don't' receive any assistance from them. I have had more than 15 years of experience in rice production, yet I have not received any loan from the BOI. Sometimes, what the BOI does is to come here and interrogate us and the money meant for us would be given to traders. I 'don't' understand why, but this makes us produce below our capacity.

Lack of access to information regarding BOI operations

Meanwhile, many participants mentioned lack of information concerning the BOI loan requirements and non-financial services. One of the participants emphasized:

We have heard about the BOI but had neither applied for the loan nor known much about the loan terms. Farmers here lack information about the operations of BOI. It is the duty of government or BOI to create awareness regarding its operations. This is because, if the farmers are aware that the BOI is there to assist them in agricultural production, they would prefer to go there. The rice farmers are always eager to receive financial assistance to at least rent more land and make more input into rice cultivation which will yield more productivity.

Another participant, Mr. Edochie, shared the same sentiment regarding lack of information on the BOI operations. He remarked that "virtually all the rice farmers in Ifite Ogwari are unaware of the BOI loan". According to him, "we have neither applied nor benefited from the BOI loan". He noted that "it is only when you know about the BOI that you can apply for its loan".

Major sources funds to rice farmers

Importantly, all the participants share the consensus that the rice farmers rely on meagre savings and borrowing to finance their rice farming. On this note, one of the participants pointed out that:

Many of the rice farmers rely on borrowing money to cultivate their rice. The rich farmers (those who farm on a large scale) go to commercial banks to take loans while the artisanal farmers (i.e. upcoming farmers) go to the Cooperatives to take loans. Others rely on their meager personal savings, family and friends to finance their rice farming.

Perspectives of BOI officials on the inaccessibility of loans to rice farmers

The interviews with the BOI officials at the Bank's Awka office reveal a brazen lack of willingness to accept responsibility regarding the inaccessibility of rice farmers to access its loans and non-financial services. A top official of the BOI emphasized that:

The BOI creates awareness of her facilities to businesses via television, radio, seminars and workshops. We also leverage on our relationship with the State Government, SMEDAN, Industrial Training Fund (ITF), Technology Incubation Centre, NYSC etc. to extend our reach to the communities in and around the State.

CONCLUSION AND RECOMMENDATION

The result of this empirical research revealed that the BOI micro-enterprises financing scheme did not enhance the growth and performance of smallholder-rice farming in Ayamelum LGA of Anambra state, from 2015 to 2023. Virtually all the participants of the study relied on the funds from meagre savings, relatives and friends, and a fraction from the commercial banks to cultivate rice. Both results from the questionnaires and interviews show that there is lack of information and knowledge regarding the BOI loan terms and support services among the rice farmers in the LGA. This has undermined the ability of rice farmers to benefit from the BOI value-chains, thereby impeding their productivity levels.

Arising from the major findings, the study recommends that there is need for the BOI to increase awareness creation regarding its operations among the rice farmers in Ayamelum LGA. Since most of these rice farmers are in the remote areas and spend more time in the rice fields, with limited access to electricity and electronic gadgets, it is essential for the BOI officials to visit the rice farmers and sensitize them on the business lending and advisory support roles of the BOI. This could be achieved by organizing seminars and workshops for the rice farmers, in order to educate them on the BOI loan terms as well as the measures to ensure prudent management of business funds.

REFERENCES

Babajide, A. A. (2012). Effects of microfinance on micro and small enterprises (MSEs) growth in Nigeria. *Asian Economic and Financial Review*, 2(3), 463-477.

Bello, B. and Abdullahi, M. M. (2018). Sociological perspective of the roles and impact of Nigeria Bank of Industry on small and medium enterprises for national developments. *Lapai Journal of Economics, 2*(2), 65-79.

Dangiwa, E.Y., Shekarau, F.S. and Dogara, M. (2022). Contributions of Bank of Industry on growth of small and medium industries in Kaduna state. *Yobe Journal of Economics*, 7(2), 88-103.

John-Akamelu, C. R. and Muogbo, U.S. (2018). The role of commercial banks in financing small & medium size enterprises in Nigeria. *European Journal of Business, Economics and Accountancy*, 6(3), 1-23.

Ministry of Foreign Affairs, Netherlands. (2022). Decent work and economic growth: The of change for private sector development. https://www.government.nl/documents/publications/2022/11/28/theory-of-change---private-sector-development-october-2022

Nwankwo, O. and James, S.O. (2017). Empirical study of Bank of Industry's loan to the development of micro, small and medium enterprises in Nigeria: 2003-2013. *Journal of Banking and Financial Dynamics*, 1, 1-8.

Ogunsanwo, O.F. and Olowo, S.O. (2020). Role of Bank of Industry on small scale entrepreneurial development in Nigeria. *American International Journal of Business Management*, 3(3), 19-24.

Thornton, P., Schuetz, T., Forch, W., Cramer, L., Abreu, D., Vermeulen, S. & Campbell, B. (2017). Responding to global change: A theory of change approach to making agricultural research for development outcome-based. *Agricultural Systems*, 152, 145-153.

Yamma, A.M., Sunday, J.D. and Mutong, S.M. (2023). Bank of Industry (BOI) and small and medium scale enterprises in Federal Capital Territory, Abuja, Nigeria, 2014-2021. *International Journal of Public Administration and Management Research*, 8(4), 86-100.

EVALUATING THE PERFORMANCE OF CUCUMBER (*CUCUMIS SATIVUS*) IN DIFFERENT GROWING MEDIA FOR SUSTAINABLE AND RESILIENT FOOD PRODUCTION IN RURAL FARMING SYSTEMS

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ABSTRACT

Cucumber (*Cucumis sativus*) is an important vegetable crop widely cultivated for its nutritional and economic value it contributes significantly to rural food security and livelihoods. However, its productivity is often limited by declining soil fertility and unsustainable cultivation practices. This study was conducted to examine the effects of innovative and sustainable growing media cocopeat, rice husk, rice husk biochar, and soil on the growth and yield performance of cucumber as a strategy to enhance resilient food production systems. A completely randomized design (CRD) was used for the experiment, with cucumber seeds grown in different media under the same environmental conditions. Data were collected on vine height, number of leaves, and stem diameter at different weeks after planting (WAP). The results showed that cocopeat and rice husk significantly enhanced cucumber growth performance compared to soil and rice husk biochar. Cocopeat recorded the highest vine height 45.6cm, number of leaves (14.6), and stem diameter 0.76 cm at 3 weeks after planting, followed closely by rice husk. In contrast, soil and rice husk biochar had the lowest growth performance. The findings suggest that cocopeat and rice husk provide better aeration, water retention, and nutrient availability, making them more suitable for cucumber cultivation than conventional soil. The study highlights the potential of integrating locally available organic residues, such as cocopeat and rice husk, into cucumber cultivation as a sustainable innovation for boosting rural horticultural productivity. By reducing dependence on conventional soil-based systems, these eco-friendly growing media can help smallholder farmers adapt to soil degradation, improve yield, and strengthen household income, it also provides practical insights for promoting resilient and sustainable vegetable production systems in rural communities, thus, contributing to food security and livelihood enhancement.

Keywords: Cucumber, growing media, cocopeat, rice husk, crop productivity

INTRODUCTION

Cucumber (*Cucumis sativus* L.), a member of the Cucurbitaceae family, is one of the most widely cultivated vegetables globally, valued for its culinary, nutritional, and medicinal uses (Liu *et al.*, 2020). It is consumed fresh or processed and contains bioactive compounds with antioxidant and anti-inflammatory properties, in addition to being rich in water, fibre, potassium, and magnesium (Sangma *et al.*, 2022).

Despite its importance, cucumber cultivation is constrained by soil degradation, nutrient depletion, and soil-borne pathogens (Osei *et al.*, 2019). These factors reduce yield and limit production efficiency. To address these challenges, alternative growing media such as cocopeat, perlite, compost, and rice husk have been investigated for their ability to improve water retention, aeration, and nutrient availability (Ebrahimi *et al*., 2021). Recent advances in sustainable agriculture have also highlighted the potential of biochar and other soilless substrates to enhance crop performance (Jiang *et al*., 2023).

Previous studies show that cucumbers grown in cocopeat–perlite mixtures produce higher yields than those in soil (Ali *et al*., 2020), while compost-based substrates improve nutrient uptake and fruit size (Waziry *et al.*, 2021). However, limited studies have compared cocopeat, rice husk, rice husk biochar, and soil under the same conditions. This study therefore aimed to evaluate cucumber growth performance in different growing media and to determine the most suitable substrate for enhanced productivity.

METHODOLOGY

The experiment was conducted at the Teaching and Research Farm, Faculty of Agricultural Sciences, Ekiti State University, Ado-Ekiti, Nigeria. The site is located in the humid tropical rainforest zone, with an annual rainfall of 1,200–1,500 mm and temperatures ranging between 25–30°C. The soil type is predominantly sandy loam.

Experimental design and treatments - A Completely Randomized Design (CRD) was used, and the media used comprised of;

Cocopeat – lightweight organic medium.

Rice husk – a byproduct of rice milling, improves aeration.

Rice husk biochar – obtained by pyrolyzing rice husk under limited oxygen.

Soil – sandy loam collected from the research farm.

Cucumber seeds (high-yielding variety) were sown in growing pots containing each medium. After germination, seedlings were thinned to one per pot. Uniform NPK 15:15:15 fertilizer was applied, and irrigation was done.

Data collection - Data were collected weekly on:

Vine height (cm), measured with a tape.

Number of leaves per plant.

Stem girth (mm), measured with a Vernier caliper.

Data analysis - Data were subjected to ANOVA using SPSS software. Mean separation was done using Duncan's Multiple Range Test at $p < 0.05$.

RESULTS

Cocopeat recorded the tallest vines, followed by rice husk, while soil produced the shortest plants (Table 1). At 3 WAP, vine height reached 45.6 cm in cocopeat compared to 30.5 cm in soil.

Table 1. Effect of growing media on vine height (cm)

Growing Medium	1 WAP	2 WAP	3 WAP
Cocopeat	8.2a	20.4a	45.6a
Rice Husk	6.5b	15.7b	44.1a
Biochar	7.9a	19.8a	37.2b
Soil	5.1c	12.2c	30.5c

Means with different letters differ significantly at $p < 0.05$)

Number of leaves - Leaf production was highest in cocopeat (14.6 at 3 WAP), followed by rice husk (14.1), while soil had the lowest (9.8) (Table 2).

Table 2. Effect of growing media on number of leaves per plant

Growing Medium	1 WAP	2 WAP	3 WAP
Cocopeat	5.4a	9.8a	14.6a
Rice Husk	4.2b	7.2b	14.1a
Biochar	5.1a	9.5a	11.5b
Soil	3.5c	6.1c	9.8c

Means with different letters differ significantly at $p < 0.05$

Stem girth - Cocopeat recorded the highest stem girth (0.76 cm at 3 WAP), while soil produced the lowest (0.48 cm) (Table 3).

Table 3. Effect of growing media on stem girth (cm)

Growing Medium	1 WAP	2 WAP	3 WAP
Cocopeat	0.23a	0.48a	0.76a
Rice Husk	0.19b	0.36b	0.73a
Biochar	0.22a	0.46a	0.59b
Soil	0.15c	0.30c	0.48c

Means with different letters differ significantly at $p < 0.05$

DISCUSSION

The findings demonstrate that cucumber growth is significantly affected by the type of growing medium. Cocopeat consistently enhanced vine height, leaf number, and stem girth, confirming reports that soilless substrates improve plant growth by maintaining optimal water–air balance and nutrient availability (Ali *et al.*, 2020; Ebrahimi *et al.*, 2021).

Rice husk supported moderate growth, likely due to its porous structure which improves aeration and drainage (Waziry *et al.*, 2021). However, its lower water-holding capacity compared to cocopeat may have limited its performance.

Rice husk biochar performed better than soil in most parameters, though not as effectively as cocopeat. Previous studies suggest biochar improves soil fertility and structure, but its effectiveness depends on production conditions and substrate combinations (Jiang *et al*., 2023).

Soil consistently showed the weakest growth, reflecting its limitations under poor fertility and compaction (Osei *et al*., 2019). This highlights the need for alternative substrates in regions where soil degradation constrains productivity.

CONCLUSION AND RECOMMENDATION

Cucumber performance was significantly influenced by growing media. Cocopeat proved most effective. Thus, adoption of cocopeat and rice husk as alternative substrates can improve cucumber cultivation, particularly in poor soils or urban settings where soilless farming is expanding.

It is recommended that soilless farming be incorporated into rural agricultural development initiatives as it can help improve household income, food security, and resilience against climate variability.

REFERENCES

Ali, M. A., *et al.* (2020). Effects of coconut coir and perlite media on cucumber growth and yield. Journal of Horticultural Science, 95(4), 553–561.

Ebrahimi, R., *et al*. (2021). Alternative growing media for sustainable vegetable cultivation. Agricultural Reviews, 42(2), 157–165.

Jiang, X., *et al.* (2023). Biochar-amended substrates and their role in sustainable crop production. Soil Use and Management, 39(1), 45–56.

Liu, H., *et al.* (2020). Nutritional and medicinal properties of cucumber. Plant Foods for Human Nutrition, 75(3), 326–335.

Osei, K., *et al.* (2019). Soil-borne constraints in cucumber production. African Journal of Agricultural Research, 14(27), 1150–1158.

Sangma, R., *et al.* (2022). Nutritional composition of cucumbers and their role in diet. International Journal of Food Science, 58(2), 221–229.

Waziry, A., *et al.* (2021). Compost-based substrates and cucumber productivity. Scientia Horticulturae, 287, 110–126.

INFLUENCE OF INOCULANTS ON GERMINATION AND PERFORMANCE OF AFRICAN YAM BEAN UNDER DROUGHT CONDITION IN ADO-EKITI, EKITI STATE, NIGERIA.

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ABSTRACT

Africa yam bean (*Sphenostylis stenocarpa*) is an underutilised legume crop with high nutritional potential, making it an essential resource for food security in many regions of Africa. However, its production is often limited by poor soil fertility and the lack of effective nitrogen-fixing symbionts. Inoculating Africa yam bean with highly effective and compatible rhizobia strain improves nodulation. A pot experiment was carried out at Teaching and Research Farm of Faculty of Agriculture, Ekiti State University, to evaluate the growth responses of Africa yam bean to four Rhizobia strains. The experiment was laid out in a complete randomized design (CRD) containing eight (8) treatments with a control and replicated three times. The Rhizobia strains used are FA_3, Br3262, USDA.110 and BR 3267, while the two Africa yam bean accessions planted are Tss67 and Tss10. The results showed that FA_3 and USDA rhizobia strains did consistently better in all the growth parameters measured in the experiment when compared with the other strains (BR3267 and BR3262). The outstanding performance of FA_3 and USDA on both accessions (Tss10 and Tss67) in improving nodulation could imply that these strains were more compatible with the legume hosts than the other strains. It could be recommended from this study that, FA3 and USDA are highly competitive and compatible rhizobia strains, which can best be used as bio-fertilizers, stimulating the nodulation and growth of Africa yam bean accessions. Further research is recommended using these rhizobia strains in combination with lower rates of N fertilizers for better nodulation and yield production of Africa yam bean accessions.

Keynotes: Africa yam bean, nitrogen-fixing symbionts, Rhizobia strains and nodulation

INTRODUCTION

African yam bean (AYB) is a leguminous crop from tropical Africa, belonging to the family *Fabaceae*. African yam bean is believed to have originated from Ethiopia and cultivated throughout West Africa countries especially, Cameroon, Cote d'Ivore, Ghana, Nigeria and Togo (Abdulkareem *et al.,* 2015). This legume is a good source of dietary protein (Ikhajiagbe and Mensah, 2012), cultivated mainly for home consumption, and while just 30% of the dry grain is sold to other consumers (Osuagwu and Nwofia, 2014). AYB seeds are high in vitamin C, dietary fibre, vitamin B6, potassium, and manganese, while low in saturated fat, sodium, and cholesterol (Utter, 2007). The seed contains 62.6% carbohydrates, 21-29% protein, 2.5% fat and high in sulphur-containing amino acid (Abdulkareem *et al.*, 2015). Although AYB has great potentials, it has received very little attention both as a food crop and in the area of research, probably because of its low seed yield per unit area, which has adversely discouraged its production, particularly in Nigeria. However, the challenges of food and nutritional insecurity can be overcome, if this crop is commercially produced and given the required research attention for its improvement and productivity (Oagile *et al*., 2007). Amoatey *et al*. (2000), reported that Africa yam bean has a big potential to contribute to national food security, having the ability to fix biological nitrogen, and able to thrive well in variety of soils including sandy soil. Rhizobia inoculation of legumes is a common and widespread practice in Europe, Australia, and America with many success stories reported (Martins *et al*., 2003; and Albareda *et al.,* 2009), however, in Africa, this practice is relatively new to farmers. The ability of legumes to fix atmospheric N_2 in symbiosis with Rhizobia strains make them excellent colonizers of low-N environments (Graham and Vance, 2003). Furthermore, numerous agricultural soils worldwide are deficient in plant nutrients and significant fertilizer requirement is needed for sustainable food production. Microbial inoculants improve plant growth, supply nutrients and suppression of various crop pests and diseases (Toota and Watanable, 2013). The nitrogen-fixing potential of rhizobium makes it possible for the nitrogen that is supplied by the rhizobia to a leguminous crop to replace the expensive industrial nitrogen (Oagile, 2012). Also, *Rhizobium* species are specific to their host plant, so producers should be sure that strain of rhizobia is appropriate for the legume host (Sajid *et al*., 2011). In a particular work, African Yam Bean nodulated profusely with both the slow growing; *Bradyrhizbium sp*. CP279 and with the fast-growing Rhizobium strains (NGR234 and ORS302) (Oagile, 2005). Such plants were grown in pots in vermiculite, watered with a nitrogen-free solution and maintained under glasshouse conditions with a 12-hour photoperiod during the months of June to August in the UK. These results compare favourably to most tropical grain legumes and show that it is possible to grow African Yam Bean without the addition of any supplementary nitrogenous fertilizer, if inoculated with compatible Rhizobium strains (Oagile, 2005). Using effective and compatible rhizobium strain can possibly influence inoculation performance

(Abayomi, *et al.*, 2008). Thus, the aim of the study is to screen the four rhizobia strains and ascertain the strain that is best compatible and effective for AYB nodulation and its nitrogen fixation potential.

METHODOLOGY

This research work was carried out at the Teaching and Research Farm, Ekiti State University, Ado-Ekiti, Nigeria during 2022 cropping seasons. The area experiences a tropical climate with distinct wet and dry season. The rainy season spans from late March or early April to late October with a break in August. The dry season starts from November to early March. The mean annual total rainfall is about 1,367mm while the average rainy days are about 112 days per annum. Temperature is almost uniform throughout the year with very little deviation from the mean annual temperature of 27^0C.

The African yam beans accessions planted were sourced from International Institute of Tropical Agricultural (IITA), Ibadan, Oyo State genetic bank, which are; Tss10 and Tss67. Four rhizobia strains were collected from IITA Ibadan (Microbiology Laboratory), which are: FA_3, USDA.110, Br 3267, and Br 3262. The seeds were inoculated with rhizobia inoculants at the rate of 5g of inoculant to 1 kg seed (Lampteys *et al*., 2014) inside petril dishes 2 days before sowing, to allow the inoculants to adequately adhere to coat of the seeds.

RESULTS

Growth parameters

Effects of Rhizobium strains on the vine length and stem girth of Africa yam bean

Table 1 shows the results of vine length and stem girth of the two Africa yam bean accessions under the effect of the four rhizobium strains. There were consistent increases in the average vine length (60 cm, 73 cm, 129 cm and 195 cm) of Tss10 accession inoculated with Br 3262 strain in the various weeks of samplings (i.e. 2, 4, 6 and 8 weeks after planting), and differ significantly at 2 weeks after planting from other vine lengths obtained on Tss10 accession inoculated by rest strains. In the case of Tss67 accession, the effect of FA_3 strain on it, gave the highest vine length of 96 cm, 193.5 cm and 250 cm, at 4, 6 and 8 weeks after planting respectively and differ significantly to other vine lengths obtained from the effect of remaining 3 strains on Tss67 accession, except at week 4 after planting, where the vine length (95 cm) recorded for Tss67 at USDA strain showed no significant. A similar trend occurred in the case of stem girth, where Tss10 gave significantly higher stem girth values all through the weeks of sampling with used of FA_3 rhizobium strain, and gave the highest stem girth of 0.81cm at 8WAP, and the strain effects on stem girth of Tss10 differ significantly from the stem girth obtained on Tss10 as result of the effects of other strains used in the experiment. For Tss67 accession. The effect of all the strains on Tss67 accession stem girth was not really significant all through the weeks of sampling. It could be seen from the data available in table 1 that effect of FA_3 strain on Tss10 accession performed consistently better on its vine length and stem girth than the rest trains and Tss10 accession did excellently better than (Tss67) used in the experiment.

Table 1: Effects of Rhizobium strains on the vine length and stem girth of Africa yam bean

		----------Weeks after planting (cm)----------							
		2	4	6	8	2	4	6	8
Treatments		VL				SG			
Accession	Tss67	23.5b	67.6	121.4	185.8	0.15b	0.18b	0.27b	0.55b
	Tss10	38.8a	70.3	116.3	195.9	0.20a	0.25a	0.37a	0.78a
	MSD	*10.4*	*12.1*	*17.8*	*26.8*	*0.03*	*0.02*	*0.05*	*0.09*
Strain	FA_3	31.3	82.5ab	147.6a	220.7a	0.19	0.24a	0.32	0.66
	Br3267	29.2	59.7bc	95.4b	165.2bc	0.19	0.20b	0.32	0.68
	Br3262	33.0	50.3c	98.8b	162.5c	0.15	0.20b	0.31	0.61
	USDA	31.2	83.3a	133.5a	215.0ab	0.17	0.23ab	0.32	0.71
	MSD	*20.0*	*23.2*	*34.1*	*51.3*	*0.06*	*0.03*	*0.09*	*0.17*
Accession x Strain									
	FA_3	27.5abc	96.0a	193.5a	250.0a	0.16ab	0.20c	0.26ab	0.50bc
Tss67	Br3267	19.0bc	52.0bc	83.5bc	143.0bc	0.20ab	0.15ed	0.28ab	0.60abc
	Br3262	6.0c	27.5c	68.0c	130.0c	0.10b	0.13e	0.20b	0.41c
	USDA	41.7ab	95.0a	140.7ab	220.0ab	0.14ab	0.23abc	0.33ab	0.69abc
	FA_3	35.0abc	69.0ab	101.7bc	191.3abc	0.22a	0.28a	0.38a	0.81a
Tss10	Br3267	39.3abc	67.3abc	107.3bc	187.3abc	0.19ab	0.24abc	0.36a	0.77ab
	Br3262	60.0a	73.0ab	129.7b	195.0abc	0.20ab	0.27ab	0.42a	0.81a
	USDA	20.7bc	71.7ab	126.3bc	210.0abc	0.19ab	0.22bc	0.31abc	0.73ab
	MSD	*34.3*	*39.8*	*58.6*	*88.0*	*0.11*	*0.06*	*0.16*	*0.30*

MSD: mean significant difference, VL= Vine length and SG= Stem girth

Columns with different letters differed significantly at 5% level of probability by Tukey test.

Africa yam bean Accessions: Tss67 and Tss10, Rhizobium Strains: FA_3, Br 3267, Br 3262, and USDA

Effects of Rhizobium strains on the number of leaves and number of branches of Africa yam bean

Table 2 showed the result for number of leaves and number of branches of the two Africa yam bean accessions under the effect of the four rhizobium strains. FA_3 effects on Tss10 gave the highest number of leaves of 248 at 8WAP and was significantly different from all the number of leaves obtained for both accessions as a result of the effects of other strains. Also, at week 6 after planting, no significant different was seen among the number of leaves obtained for Tss10 due to the effect of the four strains. For number of branches, effects of FA_3 and USDA on TssI0 and Tss67 respectively gave the highest number of branches and coincidently, differ from the other number of branches obtained due to the effects of the two remaining strains on the duo. Also, it could be seen in the experiment that the effect of Br3262 gave the lowest values for number of leaves for Tss10 accession which is 97. It could be observed all through the available values obtained for growth parameters that, strain FA_3 performed consistently better and excellently well than other strains used in this experiment.

Table 2: Effects of Rhizobium strains on the Number of leaves and Number of branches of Africa yam bean

		----------Weeks after planting----------						
		2	4	6	8	4	6	8
Treatments		NOL				NOB		
Accession	TSS67	10.2b	19.3b	64.9b	154.6b	2.0	3.8	4.2
	TSS10	13.6a	31.6a	92.4a	184.6a	2.3	3.4	4.1
	MSD	*3.2*	*5.5*	*15.6*	*25.2*	*0.4*	*1.0*	*0.8*
Strain	FA_3	10.6	27.2	94.7a	232.8a	2.7a	4.2	3.7
	Br3267	13.0	26.3	75.3ab	147.1b	2.2ab	3.8	4.4
	Br3262	11.6	19.8	61.4b	131.8b	1.7b	2.9	4.3
	USDA	12.3	28.7	83.3ab	166.8b	2.2ab	3.5	4.2
	MSD	*6.2*	*10.5*	*29.9*	*48.4*	*0.8*	*1.8*	*1.5*
Accession x Strain								
	FA_3	7.5	22.0abc	81.0a	217.5ab	2.0ab	4.0	3.0
TSS67	Br3267	12.0	16.5bc	67.5ab	130.5c	2.0ab	4.0	4.5
	Br3262	6.5	7.5c	22.5b	97.5c	1.0b	2.5	4.5
	USDA	14.7	31.3ab	88.7a	173.0abc	3.0a	4.7	4.7
	FA_3	13.7	32.3ab	108.3a	248.0a	3.3a	4.3	4.3
TSS10	Br3267	14.0	36.0a	83.0a	163.7bc	2.3ab	3.7	4.3
	Br3262	16.7	32.0ab	100.3a	166.0abc	2.3ab	3.3	4.0
	USDA	10.0	26.0ab	78.0a	160.7bc	1.3b	2.3	3.7
	MSD	*10.6*	*18.0*	*51.3*	*83.0*	*1.4*	*3.2*	*2.5*

MSD: mean significant difference NOL= Number of leaves and NOB=Number of branches
Columns with different letters differed significantly at 5% level of probability by Tukey test.
Africa yam bean Accessions: Tss67 and Tss10, Rhizobium Strains: FA_3, Br 3267, Br 3262, and USDA

DISCUSSION

Among the inoculants used in this experiment, FA_3 proved to be best and compatible for Africa yam bean accessions inoculation. The outstanding performance effects of FA_3 and USDA on both accessions (Tss10 and Tss67) in improving nodulation could imply that these strains were more compatible with the Africa yam bean accessions than the other strains used. It could also be as a result of effective colonization of the host plants by the rhizobia strains, and this could have led to adequate N fixing into the soil for the plant to utilise for good growth and development. This is, also in conformity with Berchie, *et al*., 2010, who reported that inoculating groundnut and cowpea with highly competitive, compatible and efficient rhizobia strains increases nodulation of cowpea and groundnut. Rhizobium inoculants can be used to increase growth and grain yield of Africa yam bean and other crops. The *Bradyrhizobium* strains; BR3267 and BR3262 performed reasonably well in this experiment. These two strains performed well in accordance to the work of Martins *et al*., 2003, in which they are of proven quality in increasing yields of cowpea in Brazil.

CONCLUSION AND RECOMMENDATION

Dependence on chemical fertilizers and pesticides has encouraged the thriving of industries that are producing life-threatening chemicals which

are not only hazardous for human consumption but can also disturb the ecological balance. In fact, attention is now shifting from consuming food grown with chemical fertilizers to food grown with organic fertilizers. Bio-fertilizers can help to solve the problem of food need of the ever-increasing global population. It is important to realize the useful aspects of bio-fertilizers must apply it to modern agricultural practice. The application of bio-fertilizers containing beneficial microbes help to promote crop productivity to a large extent. Rhizobia inoculation averagely increased the nodulation and yield by 63 and 67%, respectively compared to the mineral N fertilizer (20 kg N/ha) which on average increased the nodulation and yield by just 24 and 25%, respectively (Mintah, 2020).

REFERENCES

Albareda, M., Rodrigues, D. N., and Temprano, F. J. (2009). Soybean inoculation: dose, N fertilizer supplementation and rhizobia persistence in soil. Field Crops Res. 113, 352–356. doi: 10.1016/j.fcr.2009.05.013.

Abdulkareem K, Animasaun D.A, Oyedeji S, Olabanji O.M (2015). Morphological characterization and variability study of African yam beans [Sphenostylis Stenocarpa (Hochst Ex A. Rich)]. Global Journal of Pure and Applied Sciences 21(1):21-27.

Amoatey, H. M., G.Y.P. Klu, F. K. Bansa, L. M. Kumaga, S. Aboagye, Benett-Lartey and D. K. Gamedoagbao, (2000). The African yam bean (Sphenostylis stenocarpa): A neglected crop in Ghana. West African J. Applied Ecology, 1: 53-60.

Abayomi, Y.A., Ajibade, T.V., Sammuel, O.F and Saadudeen, B.F (2008) "Growth and yield responses of cowpea (Vigna unguiculata (L.) Walp) genotypes to nitrogen fertilizer (NPK) application in the Southern Guinea Savanna zone of Nigeria," Asian Journal of Plant Sciences, vol. 7, no. 2, pp. 170–176.

Graham, P.H. and Vance, C.P. 2003. Legumes: Importance and constraints to greater use. Plant Physiology 131: 872-877

IBM SPSS Statistics for Windows, (Version 23.0, 2015). Armonk, NY: IBM Corp.

Ikhajiagbe, B., Mensah, J.K. (2012). Genetic assessment of three colour variants of African yam beans (Sphenostylis stenocarpa) commonly grown in Midestern region of Nigeria. International Journal of modern botany, 2(2), 13-18 doi:10.5923/j.ijmb.20120202.01

Lamptey S, Ahiabor B. D. K, Yeboah S and Asamoah C 2014: Response of soybean (glycine max) to rhizobial inoculation and phosphorus application, Journal of Experimental Biology and Agricultural Sciences, 2(1) 2320 – 8694.

Martins, L. M. V., Xavier, G. R., Rangel, F. W., Ribeiro, J. R. A., Neves, M. C. P., Morgado, L. B., et al. (2003). Contribution of biological nitrogen fixation to cowpea; a strategy for improving grain yield in the semi–arid region of Brazil. Biol. Fertil. Soils 38, 333–339. doi: 10.1007/s00374-003-0668-4

Mintah, F., Mohammed, Y.Z., Lamptey, S. and Ahiabor, B.D.K (2020): Growth and Yield Responses of Cowpea and Groundnut to Five Rhizobia Inoculant Strains in the Guinea Savanna Zone of Ghana, Advances in Agriculture, Volume 2020 ID 884882 https://doi.org/10. 1155/2020/8848823

Oagile, O. (2005). African yam bean; morphology, clonal propagation and nitrogen fixation. PhD Thesis, University of Nottingham, UK.

Oagile O, Davey M.R & Alderson P.G (2007): African Yam Bean, An Under-Utilised Legume with Potential as a Tuber and Pulse Crop, Journal of Crop improvement, 20:1-2, Pg 53-71

Oagile O, Mmoltotsi R, Segwagwe A and Babili TP (2012): African yam bean (Sphenostylis stenocarpa) nodulates promiscuously with rhizobium indigenous to soils of Botswana. Journal of Plant Studies 1: 1927–047x

Sajid M, Rab A, Wahid F.I, et al, 2011 Influence of Rhizobium inoculation on growth and yield of groundnut cultivars. Sarhad J Agric 27:573-576.

Toota K, and Watanabe T. 2013. Recent trends in microbial inoculants in agriculture. Microbes Environ; 28(4): 403-4.

EFFECTS OF INFORMAL ECONOMIC ACTIVITIES ON THE WELLBEING OF RURAL YOUTH IN SOUTHWEST, NIGERIA

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ABSTRACT

This study examined the effects of informal economic activities (IEAs) on the wellbeing of rural youth in Southwest Nigeria. A multi-stage sampling technique was employed to select 240 rural youth across selected communities. Primary data were collected through well-structured questionnaires and analysed using descriptive statistics and multiple regression analysis. The descriptive results revealed that the majority of respondents were young adults aged between 21 and 30 years, predominantly female, with secondary education and moderate household sizes. Most were involved in various informal economic activities such as petty trading, artisanship, and small-scale farming, with income and family support serving as key motivations for participation. The regression analysis showed that income from informal activities ($\beta = 0.425$, $p < 0.01$), access to credit ($\beta = 0.218$, $p < 0.01$), education level ($\beta = 0.112$, $p < 0.01$), hours spent in IEAs ($\beta = 0.067$, $p < 0.01$), and training participation ($\beta = 0.145$, $p < 0.05$) significantly influenced the well-being of rural youth. The model had an R^2 value of 0.612, indicating that about 61.2% of the variation in well-being was explained by the independent variables. The study concludes that informal economic activities significantly enhance the economic and social well-being of rural youth by improving income levels, self-reliance, and access to livelihood opportunities. It recommends that government and development agencies strengthen support for the informal sector through the setting up of a formidable, well-coordinated group of networks that can facilitate the transition of these youth into formal economic systems that will ensure access to social protection, government incentives, and inclusive development opportunities.

Keywords: Informal Economic Activities, Wellbeing, Rural Youth, Income, Credit Access, Southwest Nigeria

INTRODUCTION

The informal economy has emerged as an essential part of economic activity in many developing nations, acting as a significant source of income, particularly in rural regions with few formal job opportunities (Kouakou & Yéo, 2025). In Nigeria, this informal sector includes various income-generating activities such as street vending, skilled trades, transportation services, small-scale manufacturing, and subsistence agriculture. These activities typically feature low barriers to entry, minimal capital investment, and limited regulatory oversight (Mumbire, 2025). Despite operating outside formal structures, the sector employs millions of Nigerians and is crucial for maintaining rural households and alleviating poverty.

Rural youth in Nigeria face ongoing socio-economic difficulties such as inadequate education, high unemployment rates, and diminishing agricultural prospects, which compel many to turn to informal economic activities for survival and empowerment (Haruna & Haliru, 2025). Although the informal sector offers flexibility, autonomy, and income opportunities, it is frequently characterised by low wages, instability, and insufficient social safety nets (Linh, 2025). Therefore, it is vital to understand the effects of these activities on the social, economic, and psychological well-being of youth, as this understanding can inform the creation of inclusive policies. Analysing these impacts can help design interventions that improve productivity, ensure income stability, and enhance the quality of life for rural youth, while also contributing to broader goals of rural development, youth empowerment, and inclusive economic growth in Nigeria.

This study, therefore, investigates the effects of informal economic activities on the well-being of rural youth in Southwest Nigeria, with specific emphasis on the types of activities engaged in, reasons and their level of involvement, their economic contributions, challenges faced, and the overall impact on livelihood outcomes.

METHODOLOGY

The research utilised a multi-stage sampling method to select 240 rural youth from three states in Southwest Nigeria—Ekiti (60), Oyo (120), and Osun (60)—to investigate how informal economic activities impact their well-being. In the second state, three local government areas were purposively selected from each state based on the density of rural enterprises. A random selection of communities and systematic sampling of participants within each community followed this. Primary data were gathered using a structured questionnaire that addressed socio-economic characteristics, types of informal activities, and well-being indicators. The data were analysed through descriptive statistics (frequencies, percentages, and means) to summarise the characteristics of respondents; a Likert scale was employed to assess the well-being index resulting from their engagement in informal economic activities; and regression analysis was conducted to identify the factors affecting the well-being of rural youth.The regression model is stated as:

$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\varepsilon$

Y = a composite Wellbeing Index (WBI) was constructed using responses to several wellbeing-related indicators (economic, health, social, psychological wellbeing, housing and living condition. These indicators were measured on a five-point Likert scale (1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High).

X_1 = Income from IEAs (₦)

X_2 = Access to credit (1 = Yes, 0 = No)

X_3 = Level of education (Years)

X_4 = Hours spent in IEAs (per week)

X_5 = Training participation (1 = Yes, 0 = No)

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows an overview of the socio-economic characteristics of respondents. The result revealed that a significant portion of the rural youth (40.0%) were within the 26–30 age range, with an average age of 26.7 years. This indicates a predominantly youthful and dynamic demographic. Females represented a slightly larger share (53.3%) than males, suggesting a rise in female involvement in informal economic activities. The majority of respondents identified as Christians (42.5%) and were single (43.8%), with an average household size of six members (SD = 2.0). This reflects typical family dynamics in Southwest Nigeria. About 42.5% had finished secondary school, suggesting a moderate level of education that may impact their livelihood choices. The main occupation was schooling (37.9%), followed by artisanal and agricultural pursuits, while personal savings (35.4%) served as the primary source of credit, pointing to limited access to formal financial services. The average annual income amounted to ₦335,447.99 (SD = ₦164,717.94), indicating modest earnings within the informal sector. Additionally, a notable percentage (36.7%) were members of cooperative groups, emphasising the role of social networks in bolstering youth economic endeavours.

Table 1: Summary of respondents' socioeconomic characteristics (N = 240)

Variable	Major category	Mean ($\bar{X}$)	Standard Deviation (SD)
Age (years)	26–30 years (40.0%)	26.7	8.9
Sex	Female (53.3%)		
Religion	Christianity (42.5%)		
Marital Status	Single (43.8%)		
Household Size	≤ 5 members (46.7%)	6.0	2.0
Education	Secondary (42.5%)		
Primary Occupation	Schooling (37.9%)		
Source of Credit	Personal savings (35.4%)		
Annual Income (₦)	101,000–200,000 (50.0%)	335,447.99	164,717.94
Membership in Organisation	Cooperative group (36.7%)		

Source: Field Survey, 2025

Informal economic activities - involvement, level of involvement, reasons and constraints

The findings illustrated in Figures 1–4 highlight significant trends concerning the informal economic activities (IEAs) undertaken by rural youth in Southwest Nigeria. Figure 1 indicates that the predominant IEAs consist of selling bread and soft drinks, agricultural produce, food vending, and small-scale trading, with each activity involving over 40% of participants—suggesting these activities are essential for livelihoods and food security in rural areas. Figure 2 reveals that a significant portion of respondents (approximately 30%) engage in these activities five days a week, indicating a strong reliance on the informal sector for daily survival. Figure 3 shows that poverty (around 55%), familial support (nearly 45%), and youth unemployment (about 40%) are the primary reasons for engaging in IEAs, which reflects limited opportunities in formal employment and education as factors driving participation. Lastly, Figure 4 demonstrates that significant challenges faced include insufficient funding (over 50%) and inadequate market infrastructure, theft, and intense market competition. These results suggest that while IEAs are crucial for enhancing youth livelihoods, they are hindered by structural and financial obstacles. This corresponds with the insights from Sultana *et al.* (2022) and Korsunova *et al.* (2022), who noted that while informal enterprises are essential for income generation in rural areas, they need focused support and policy changes to improve sustainability and overall well-being.

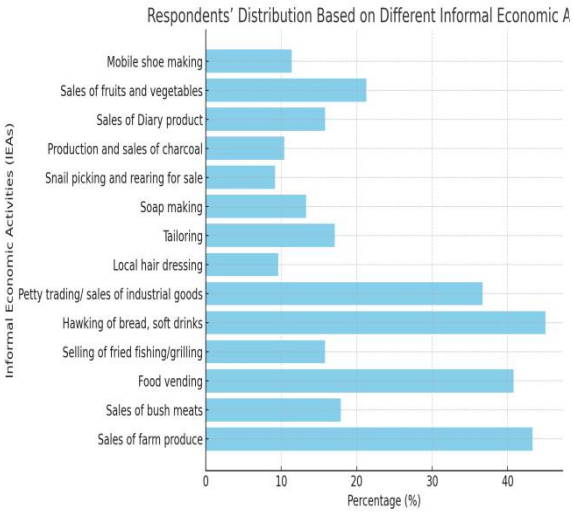

Figure 1

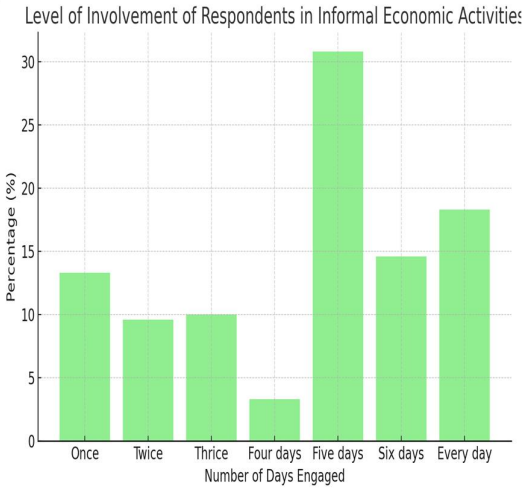

Figure 2

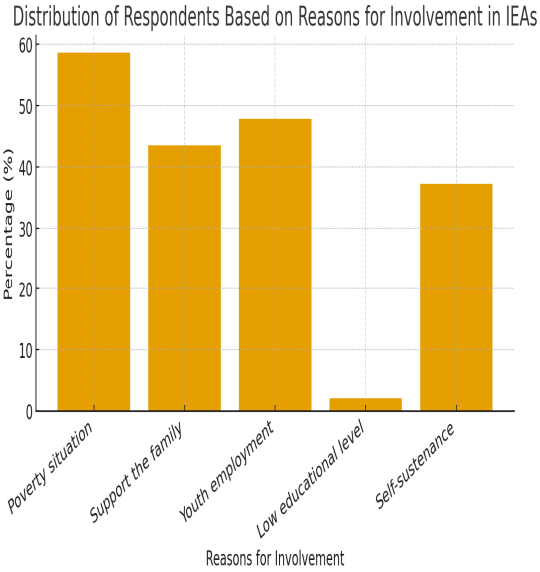

Figure 3

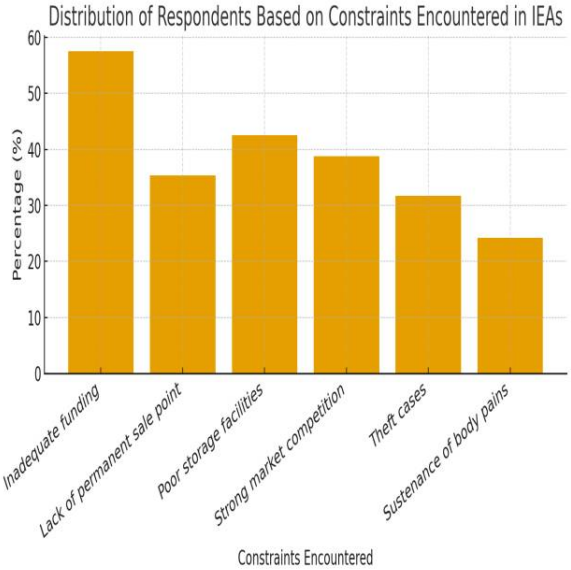

Figure 4

Perceived wellbeing index of respondents

The data presented in Table 2 shows that rural youth in Southwest Nigeria have a moderate overall well-being (Mean = 3.63), indicating that while informal economic activities assist with livelihood, their income and living standards are still limited.

Table 3: Perceived wellbeing index of respondents

Wellbeing dimension	Mean (X̄)	Standard Deviation (SD)	Interpretation
Economic wellbeing (income stability, savings, livelihood security)	3.84	0.72	High wellbeing
Social wellbeing (family relations, community support, participation)	3.67	0.81	Moderate wellbeing
Psychological wellbeing (self-esteem, life satisfaction, optimism)	3.58	0.79	Moderate wellbeing
Health and nutrition wellbeing (access to food, medical care)	3.42	0.85	Moderate wellbeing
Overall Wellbeing Index (aggregate mean)	3.63	0.79	Moderate wellbeing

Source: Field Survey, 2025

The economic well-being aspect received the highest rating (3.84), suggesting that income-generating activities in the informal sector positively impact financial stability. Nevertheless, moderate scores in the social, psychological, and health areas highlight ongoing challenges related to social inclusion, mental resilience, and healthcare access—factors that may need policy attention and empowerment initiatives focused on youth.

3.4 Effect of IEAs on respondents' well-being

Table 4 shows the regression estimates of the effect of informal economic activities (IEAs) on respondents' well-being. The constant value of 3.214, which is statistically significant, suggests that the baseline well-being of respondents remains high even when other variables are controlled for. Income generated from IEAs has a positive and significant coefficient ($\beta = 0.425$, $p < 0.01$), indicating that an increase in income from these activities considerably improves the living standards of respondents. Access to credit ($\beta = 0.218$, $p < 0.01$) similarly has a positive effect, implying that respondents who receive financial assistance enjoy greater stability in their welfare. In addition, education level positively influences well-being ($\beta = 0.112$, $p < 0.01$), demonstrating that additional years of education enhance productivity and overall quality of life. Moreover, the number of hours spent in IEAs each week ($\beta = 0.067$, $p < 0.01$) significantly contributes to well-being, indicating that greater involvement in these activities leads to increased satisfaction and income. Participation in training ($\beta = 0.145$, $p < 0.05$) also enriches well-being by fostering improved skills and self-sufficiency among respondents. The model's R^2 value of 0.612 suggests that the included variables account for approximately 61.2% of the variability in well-being, while the adjusted R^2 (0.597) affirms a good fit for the model. The significant F-statistic (41.25, $p < 0.01$) demonstrates that the overall model is statistically sound and dependable.

Table 4: Regression estimates of the effect of IEAs on respondents' wellbeing

Variable	β	S E	t-val	p-val
Constant	3.214	0.412	7.80	0.000
Income from IEAs (₦)	0.425	0.097	4.38	0.000
Access to Credit (1 = Yes)	0.218	0.082	2.66	0.008
Level of Education (Years)	0.112	0.041	2.73	0.007
Hours Spent in IEAs (per week)	0.067	0.023	2.91	0.004
Training Participation (1 = Yes)	0.145	0.071	2.04	0.043
R^2	0.612			
Adjusted R^2	0.597			
F-statistic	41.25			0.000
Dependent Variable: Wellbeing Index				

Source: Field Survey, 2025

CONCLUSION AND RECOMMENDATION

The results show that many youths are engaged in informal economic activities due to a lack of access to formal job opportunities, insufficient skills, and the urgent need for income to support their livelihoods. Although these informal jobs are crucial in enhancing household welfare and strengthening local economies, they frequently lack social protection, job security, and access to government benefits. The failure to register formally and weak institutional connections further prevents young people from accessing empowerment programs, credit resources, and capacity-building efforts aimed at recognised businesses.

To address these issues, it is suggested that informal youth groups be gradually transformed into formal cooperatives or registered business networks. This can be accomplished through targeted awareness campaigns, streamlined registration procedures, and the development of local support centres to assist youth in navigating the process of business formalisation. Government entities and development partners should also offer incentives like start-up funds, low-interest borrowing options, training programs, and access to digital marketing resources to promote formalisation. This approach would allow young entrepreneurs to benefit from social protection, engage in policy development, and contribute more sustainably to the nation's overall economic growth.

REFERENCES

Haruna, H., & Haliru, A. M. (2025). Youth Unemployment and Rising Inflation in Nigeria: A Call for Sustainable Economic Empowerment Strategies. *Journal of Philosophy, Policy and Strategic Studies*, *1*(5), 129-137.

Korsunova, A., Halme, M., Kourula, A., Levänen, J., & Lima-Toivanen, M. (2022). Necessity-driven circular economy in low-income contexts: How informal sector practices retain value for circularity. *Global Environmental Change*, *76*, 102573.

Kouakou, D., & Yéo, K. I. (2025). Can innovation reduce the size of the informal economy? *Comparative Economic Studies*, *67*(3), 623-681.

Linh, B. K. (2025). Vulnerability of the informal sector in an emerging economy: a multi-level analysis. *International Review of Applied Economics*, *39*(1), 74-99.

Mumbire, R. (2025). Empowering women in informal economy through enhancing financial access and credit opportunities in Zimbabwe. In *Examining Barriers and Building Resiliency for Rural Women Entrepreneurs* (pp. 163-190). IGI Global Scientific Publishing.

Sultana, N., Rahman, M. M., & Khanam, R. (2022). Informal sector employment and economic growth: evidence from developing countries in SDG perspective. *Sustainability*, *14*(19), 11989.

PROCLIVITY OF RURAL WOMEN FARMERS TO UTILISE THE VIOLENCE AGAINST PERSONS PROHIBITION (VAPP) ACT TO ADDRESS SEXUAL HARASSMENT, EXPLOITATION, AND ABUSE (SHEA) IN KADUNA STATE, NIGERIA

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ABSTRACT

Rural women farmers in Kaduna State, Nigeria, remain vulnerable to Sexual Harassment, Exploitation, and Abuse (SHEA) despite Kaduna being the first northern state to domesticate the Violence Against Persons Prohibition (VAPP) Act in 2018. These violations threaten women's safety, livelihoods, and agricultural productivity, thereby undermining food security. A multi-stage sampling procedure was used to select four LGAs, where Focus Group Discussions (FGDs) were conducted with 86 rural women farmers. Data was transcribed, coded, and thematically analysed using Braun and Clarke's framework. Five major themes emerged from the analysis. These were SHEA experiences and treatment received, awareness of the VAPP Act, knowledge of its provisions, preferred information sources, and women's proclivity to use the Act. Findings revealed that most respondents had experienced at least one form of SHEA, but very few reported such cases formally or sought redress through the Act. Awareness of the VAPP Act was low, knowledge of its provisions limited, and trust in formal justice mechanisms weak. Instead, women relied more on traditional leaders, community elders, and religious authorities for mediation and information. The study concludes that limited awareness restricts knowledge, weakens proclivity, and makes actual utilisation of the VAPP Act rare. Strengthening awareness, knowledge, and legal literacy, while reducing barriers through trusted community channels, is critical to improving utilisation and protection. This is essential to safeguard women farmers' livelihoods and food security.

Keywords: VAPP Act, SHEA, Rural women farmers, Legal literacy, GBV

INTRODUCTION

Sexual Harassment, Exploitation, and Abuse (SHEA) are manifestations of gender-based discrimination and entrenched power imbalances. SHEA includes acts such as sexual exploitation, where authority is abused for sexual gain, and sexual abuse involving forced or coerced acts, ranging from rape and unwanted touching to verbal misconduct (UN Women, 2020). These violations often occur within hierarchical spaces, including workplaces and informal labour settings.

In Nigeria, SHEA is pervasive across all socio-economic groups. The National Bureau of Statistics (2019) reports that one in four girls and one in ten boys experience sexual abuse before age sixteen. Kaduna State reflects these national trends, particularly in rural areas where gender norms, limited education, and restricted resources exacerbate women's vulnerability (NDHS, 2018).

In the agricultural sector, critical to Nigeria's economy, SHEA poses a distinct threat to productivity and food security. Women constitute a significant share of the farming workforce yet face harassment and abuse that undermine their safety, mental health, and economic participation (FAO, 2019). These issues often push women away from agriculture or silence their experiences, contributing to persistent poverty and inequality.

To address gender-based violence, Nigeria enacted the Violence Against Persons Prohibition (VAPP) Act in 2015, with Kaduna State being the first in Northern Nigeria to domesticate it in 20. Implementation includes specialized law enforcement units, safe spaces for survivors, and awareness programs (Kaduna State Government, 2022). However, gaps remain in rural areas where limited legal literacy and harmful socio-cultural practices sustain high sexual violence prevalence (World Bank, 2020).

Although legal frameworks exist, rural women farmers often lack knowledge of their rights or the means to seek justice. Most existing research on gender and agriculture emphasizes access to land, credit, and inputs, leaving the specific impact of SHEA underexplored. In many farming communities, distrust of formal institutions and fear of stigma discourage reporting. While radio programs and NGO efforts provide some legal awareness, these do not always reach rural women effectively.

This study examines rural women farmers' proclivity to utilise the VAPP Act's SHEA provisions in Kaduna State. It seeks to bridge the gap between legal protections and lived realities, contributing to policies that strengthen women's safety, empowerment, and agricultural participation. Specifically, it aims to:

1. Identify the types of sexual violence experienced by women farmers and treatment received.
2. Assess the level of awareness of the VAPP-SHEA Act among women farmers.
3. Examine the level of knowledge of the VAPP-SHEA Act among women farmers.
4. Determine the preferred sources of legal and support-related information on the VAPP-SHEA Act.

METHODOLOGY

The study was conducted in Kaduna State, Northwestern Nigeria, using a multistage sampling technique. Four Local Government Areas (Zaria, Sabon Gari, Chikun, and Kaduna North) were purposively selected for their high agricultural activity and reported cases of SHEA. In each LGA, one rural ward and one village were randomly chosen, giving a total of four villages from which female farmers were proportionately selected, resulting in 86 participants. Data were collected through focus group discussions (FGDs) comprising 8 to 12 women each. All discussions were audio-recorded with informed consent and complemented with field notes. Transcripts were analysed thematically, following Braun and Clarke's (2006) six-phase framework for thematic analysis. The analysis identified key themes around women's experiences of sexual violence and treatment received, awareness and knowledge of the VAPP-SHEA Act, preferred sources of information, and their proclivity toward utilising the Act. Verbatim quotes were used to illustrate key findings and preserve participants' voices.

RESULTS AND DISCUSSION

Experience of sexual violence and treatment received

Participants across all FGDs demonstrated varied understanding of sexual harassment, exploitation, and abuse (SHEA). Reports of SHEA were common in all four LGAs, with most women knowing at least one affected person. Incidents were largely handled informally by local leaders such as the *sarki*, with few cases reaching law enforcement. "The Sarki warned him to stop, but nothing else happened." (FGD, Chikun LGA).

Satisfaction with informal responses was low due to poor follow-up and lack of accountability. Women who accessed medical or legal support were optimistic but noted such interventions were rare. Fear of stigma and reliance on informal mechanisms continue to limit access to justice. These findings align with Tribune Online (2024), which reported that 30% of Nigerian women aged 15–49 experience sexual violence, often by acquaintances, and that stigma frequently deters survivors from seeking help.

Awareness of the VAPP-SHEA act

Awareness of the Violence Against Persons (Prohibition) Act (VAPP Act) was critically low. Few participants had heard of it, mainly through radio or community discussions, while many confused it with moral enforcement by HISBAH or other local laws.

"I've heard people talk about it on radio, but I don't really know what it means." (FGD, Kaduna North LGA)

Awareness was higher among women with prior contact with NGOs or those who attended sensitization sessions, suggesting exposure to organized outreach strongly influences knowledge. These findings mirror UNESCO (2021), which highlights that lack of structured education limits public understanding of gender-related legislation.

Knowledge of the VAPP-SHEA Act

Among those aware of the Act, understanding was shallow. Many could not distinguish between rape, indecent assault, and harassment, while some believed the Act primarily protects men. Only a few recognized that domestic violence within marriage is covered:

"I thought what happens between husband and wife is their personal matter." (FGD, Zaria LGA)

Knowledge of enforcement mechanisms was limited; police and HISBAH were most cited, and only a few were aware of NAPTIP's mandate. These findings reflect Okafor and Emeka (2021), who note that weak enforcement and overlapping legal systems undermine the effectiveness of gender protection laws in Nigeria.

Preferred Sources of Information on the VAPP-SHEA Act

NGOs emerged as the most trusted source of information, valued for consistent presence and community programs. Radio ranked second, appreciated for accessibility during farm work, followed by traditional and community leaders. Agricultural extension agents and community meetings were least preferred due to limited coverage and perceived inaccuracy.

"If NGOs also teach us about legal issues, their visits will be even more helpful." (FGD, Chikun LGA)

These findings align with Airaoje et al. (2025), emphasizing that community education campaigns involving trusted local actors are essential for promoting legal awareness.

Proclivity Toward Utilising the VAPP-SHEA act

Participants displayed low inclination to pursue justice through formal legal channels, perceiving the Act as distant or irrelevant due to cultural norms, distrust of authorities, and lack of accessible justice systems.

"Even if the law exists, who will enforce it here?" (FGD, Sabon Gari LGA)

While some women expressed interest in the Act's protective provisions, scepticism regarding enforcement and support services remained high. Preference for traditional or community-based resolution mechanisms persisted, consistent with Airaoje et al. (2025). Strengthening local institutions, improving rural legal access, and integrating gender-sensitive legal education into community programs remain essential.

CONCLUSION AND RECOMMENDATIONS

The study concluded that rural women farmers in Kaduna State face high exposure to Sexual Harassment, Exploitation, and Abuse (SHEA), yet awareness and knowledge of the VAPP-SHEA Act remain low. Limited legal literacy and weak institutional response restrict women's active participation and productivity in agriculture. It is recommended that agricultural extension programs integrate legal awareness and gender sensitization into their rural outreach. Strengthening collaboration among NGOs, extension agents, and traditional structures will improve women's protection, enhance participation, and promote inclusive rural development.

REFERENCES

Airaoje, O. K., Uchendu, C. E., Akin-Odukoya, O. O., Aondover, E. M., & Obada, A. A. (2025). *Gender-based violence as a public health crisis: Consequences for Nigerian women and society. Britain International of Humanities and Social Sciences (BIoHS) Journal, 7*(1), 75–92. https://doi.org/10.33258/biohs.v7i1.1243

Food and Agriculture Organization (FAO). (2019). *The state of food and agriculture 2019: Moving forward on food loss and waste reduction.* FAO. https://www.fao.org/3/ca6030en/ca6030en.pdf

Kaduna State Government. (2022). *Kaduna State report on the implementation of the Violence Against Persons (Prohibition) Act.* Ministry of Human Services and Social Development.

National Bureau of Statistics (NBS). (2019). *National survey on sexual and gender-based violence in Nigeria.* NBS.

National Population Commission (NPC) [Nigeria] & ICF. (2018). *Nigeria Demographic and Health Survey 2018.* NPC and ICF. https://dhsprogram.com/pubs/pdf/FR359/FR359.pdf

Okafor, P., & Emeka, I. (2021). Implementation challenges of the Violence Against Persons Prohibition Act in Nigeria. *African Human Rights Law Journal*, 21(2), 413-432. https://doi.org/10.17159/1996-2096/2021/v21n2a10

Tribune Online. (2024, November 25). *30% of Nigerian women face gender-based violence—Women Affairs Minister*. Retrieved from https://tribuneonlineng.com/30-of-nigerian-womenface- gender-based-violence/

UN Women. (2020). *Handbook on addressing sexual harassment, exploitation and abuse*. UN Women. https://www.unwomen.org/en/digital-library/publications/2020

UNESCO. (2021). *Education for gender equality and prevention of gender-based violence in schools.* Paris: United Nations Educational, Scientific and Cultural Organization.

World Bank. (2020). *Gender-based violence: An analysis for Nigeria.* World Bank Group. https://documents.worldbank.org

CONTRIBUTIONS OF FARMER COOPERATIVES TO SUSTAINABLE AGRICULTURAL PRACTICES AMONG RURAL FARMING HOUSEHOLDS IN OYO STATE, NIGERIA

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ABSTRACT

Farmer cooperatives help farmers overcome challenges of limited access to inputs and markets, which hinder productivity, by encouraging collective action, knowledge sharing, and stronger market linkages. This study assessed the contributions of cooperatives to sustainable agricultural practices (SAPs) among rural farming households in Oyo State, Nigeria. A multi-stage sampling procedure was used to select 240 farmers. The study examined participation of farmers in cooperatives, SAPs adopted, extent to which cooperatives facilitate adoption, and challenges faced. Data was collected using structured questionnaires and analysed with descriptive and inferential statistics (regression analysis). Results show that 97.1% were cooperative members with 4.94 years average membership, and 68.3% focused on crop production. High participation was recorded in group input purchases (85.5%); savings and credit schemes (79.5%); produce marketing (76%); community projects (72.4%); training (70%); and peer monitoring (62.9%). Adopted practices included crop rotation (99.2%), reduced chemical use (91.7%), conservation tillage (90.8%), and mixed cropping (88.3%). Majority (58.8%) reported high facilitation by cooperatives. Major challenges identified were climate change ($\bar{x}$ = 1.8), limited funding (1.6), and poor extension access (1.2). Regression analysis revealed that age ($\beta = 0.185$, $p < 0.05$), education ($\beta = 0.221$, $p < 0.05$), farm size ($\beta = 0.203$, $p < 0.05$), cooperative membership ($\beta = 0.215$, $p < 0.05$), participation score ($\beta = 0.304$, $p < 0.01$), and challenge score ($\beta = -0.182$, $p < 0.05$) significantly influenced SAP adoption ($R^2 = 0.389$, $p < 0.01$). Farmer cooperatives enhance sustainable practices in Oyo State; strengthening them with funding and extension support is recommended.

Keywords: Farmer cooperatives; sustainable agricultural practices; rural farming households; cooperative membership

INTRODUCTION

Agriculture plays a critical role in sustaining rural livelihoods and ensuring food security, especially in developing countries where the majority of the population depends on agriculture for income and sustenance (FAO, 2022). Through cooperatives, farmers can adopt sustainable agricultural practices such as crop rotation, integrated pest management, organic farming, and soil conservation, which contribute to long-term agricultural productivity and environmental sustainability (Mwambi et al., 2020). While some cooperatives have successfully facilitated the adoption of sustainable practices and improved rural livelihoods, others face significant challenges, including poor governance, inadequate financial resources, and low participation among members (Mekonnen et al., 2021). This study seeks to fill this gap by investigating the role of farmer cooperatives in promoting sustainable agricultural practices among rural farming households in Oyo State. The specific objectives were to: describe the socioeconomic characteristics of the respondents; assess the participation of rural farmers in farmer cooperatives in Oyo State; identify the sustainable agricultural practices promoted by farmer cooperatives in the study area; examine the extent to which farmer cooperatives facilitate the adoption of sustainable agricultural practices among rural households; identify the challenges faced by farmer cooperatives in promoting sustainable agricultural practices.

METHODOLOGY

The study was conducted in Oyo State, Nigeria. The population of the study was made up of all active members of registered agricultural cooperatives in Oyo State. A multi-stage sampling procedure was used to select 240 cooperative farmers for the study. A well-structured interview schedule and questionnaire were used to collect information from the respondents.

RESULTS AND DISCUSSION

Participation in cooperative activities

Table 1 shows strong farmer participation in cooperative activities. The highest involvement is group input purchase (85.5%), reflecting the benefits of collective buying in reducing costs and ensuring quality. This agrees with the findings of Mwaura (2017) that farmer cooperatives are key players in reducing transaction costs for inputs and outputs by allowing farmers to benefit from bulk purchasing and collective marketing.

Table 1: Participation of rural farmers in farmer cooperative activities

Cooperative activities	Frequency	Percentage
Group input purchase	242	85.5
Savings and credit schemes	225	79.5
Produce aggregation and marketing	215	76.0
Community development projects	205	72.4
Training and capacity building	198	70.0
Decision-making and leadership elections	187	66.1
Farm visits and peer monitoring	178	62.9
Record keeping and documentation	160	56.5

Source: Field study, 2025

Sustainable agricultural practices adopted by farmer cooperative

Result in Table 2 shows sustainable agricultural practices adopted by farmer cooperative. Crop rotation is the most adopted sustainable practice (99.2%), reflecting its widespread adoption and recognition for improving soil fertility and reducing pest pressure. This aligns with the findings of Pretty et al. (2018) that crop rotation is widely recognized for its ability to enhance soil fertility, break pest cycles, and reduce the need for chemical inputs.

Table 2: Sustainable agricultural practices adopted by farmer cooperatives

Sustainable Agricultural Practices	Frequency	Percentage
Crop rotation	238	99.2
Reduced chemical input use	220	91.7
Conservation tillage	218	90.8
Mixed cropping	212	88.3
Livestock grazing management	207	86.3
Soil and water conservation	201	83.8
Integrated pest management	201	83.8
Agroforestry	180	75.0
Organic farming	178	74.2
Improved fallowing	117	48.8

Source: Field survey, 2025

Extent to which farmer cooperatives facilitate the adoption of sustainable agricultural practices among rural farming households

The findings in Table 3 show that above average of the respondents (58.75%) reported a high level of facilitation of sustainable agricultural practices by farmer cooperatives, while 41.25% indicated low facilitation. This indicates that cooperatives play a crucial role in supporting the adoption of sustainable farming practices, a significant proportion of farmers still consider the support inadequate.

Table 3: Level of facilitation of sustainable agricultural practices by farmers' cooperatives

Level of facilitation	Frequency	Percentage	Minimum score	Maximum score	Mean	Standard deviation
High facilitation	141	58.75	2.13	2.28	2.11	0.09
Low facilitation	99	41.25				
Total	240	100				

Source: Field survey, 2025

Challenges faced by cooperative in promoting sustainable agricultural practice

Table 4 reveals the challenges faced by cooperative in promoting sustainable agricultural practice. The most significant challenge is climate change and weather variability ($\bar{x}$ = 1.8)**,** which disrupts planning and implementation of eco-friendly practices due to unpredictable weather patterns like droughts and floods. According to the Food and Agriculture Organization (FAO) (2017), erratic weather conditions such as droughts, floods, and shifting rainfall patterns have a profound impact on agricultural productivity.

Table 4: Challenges faced by cooperatives in promoting sustainable agricultural practices

Challenges	Severe challenge	Mild challenge	Not a challenge	WMS	Rank
Climate change and weather variability	200 (83.3)	29 (12.1)	11 (4.6)	1.8	1st
Limited access to funding	171 (71.3)	40 (16.7)	29 (12.1)	1.6	2nd
Competition from conventional agriculture	162 (67.5)	61 (25.4)	17 (7.1)	1.6	2nd
Lack of modern farming equipment	118 (49.2)	82 (34.2)	40 (16.7)	1.3	4th
Lack of technical expertise in sustainable agricultural practice	107 (44.6)	101 (42.1)	32 (13.3)	1.3	4th
Poor access to extension service	91 (37.9)	100 (41.7)	49 (20.4)	1.2	6th

Source: Field survey, 2025. Figures in parentheses are percentages. Grand mean = 1.22

Regression analysis of contribution of some selected independent variables to sustainable agricultural practices among rural farming households in Oyo State

The regression analysis in Table 5 examines the contribution of selected socio-economic and cooperative-related factors to sustainable agricultural practices among rural farming households in Oyo State, with the R-square (R^2) value of 0.389 indicating that approximately 38.9% of the variation in sustainable agricultural practices can be explained by the independent variables in the model. The adjusted R^2 of 0.341 shows a fairly good model fit after accounting for the number of predictors, while the F-value of 8.071 and significance level (p = 0.000) suggest that the overall model is statistically significant at the 1% level.

Table 5: Regression analysis of contribution of some selected independent variables to sustainable agricultural practices among rural farming households in Oyo State

Model	Unstandardized Coefficients (β)	Std. error	Standardized Coefficients (β)	T	Sig.
(Constant)	32.489	7.804	–	4.163	–
Age	0.202	0.089	0.185	2.270	0.025
Sex (male)	1.864	1.102	0.098	1.692	0.094
Educational level	1.248	0.451	0.221	2.767	0.007
Household size	0.435	0.277	0.107	1.571	0.120
Farm size	0.876	0.325	0.203	2.694	0.009
Years of membership	1.112	0.418	0.215	2.662	0.010
Participation score	0.584	0.141	0.304	4.139	0.000
Challenge score	-1.762	0.713	-0.182	-2.471	0.015

Source: Data analysis, 2025

Model Summary:

R = 0.624, R^2 = 0.389, Adjusted R^2 = 0.341, Standard Error of Estimate = 6.782
F-value = 8.071, Sig. (p-value) = 0.000

CONCLUSION AND RECOMMENDATIONS

The findings of the study concluded that sustainable practices such as crop rotation, reduced chemical input use, and conservation tillage were highly adopted. Simple majority of the respondents reported high facilitation of sustainable agricultural practices by farmer cooperatives.

Based on the findings of this study, it was recommended that:

Government and NGOs should collaborate with cooperatives to provide regular, practical training and extension services, particularly focusing on less adopted practices like agroforestry, organic farming, and soil and water conservation.

REFERENCES

Akinyemi, S. O., Olayemi, O., and Akinmoladun, A. F. (2018). Role of farmer cooperatives in promoting sustainable agricultural practices in Southwest Nigeria. *Journal of Rural Development*, 37(2), 143-158.

Food and Agriculture Organization (FAO). (2017). *Climate Change and Food Security: Risks and Responses*. FAO.

International Fund for Agricultural Development (IFAD). (2019). *Financing Sustainable Agriculture: Barriers and Opportunities for Smallholder Farmers in Developing Countries*. IFAD.

Mekonnen, D., Tessema, W., and Alemu, S. (2021). Governance challenges in farmer cooperatives and their impact on sustainable agriculture: Evidence from rural Ethiopia. *African Journal of Agricultural Economics, 16*(1), 59–74.

Mwambi, M., Oduol, J., and Mbatia, O. (2020). Farmer cooperatives and sustainable

agriculture in Kenya: Adoption of climate-smart practices. *Journal of Agricultural Economics, 71*(1), 110–127.

Mwaura, F. (2017). Farmer Cooperatives: Enhancing Market Access and Reducing Transaction Costs. *Journal of Agricultural Economics*, 28(2), 15-32.

Pretty, J. N., Benton, T. G., Bharucha, Z. P., Dicks, L. V., Godfray, H. C. J., and Thompson, J. (2018). Global assessment of agricultural system redesign for sustainable food security. *Nature Sustainability*, 1(3), 168-173.

REVIEWING YOUTH-LED CLIMATE-SMART APPROACHES FOR RESILIENT HORTICULTURAL DEVELOPMENT IN NIGERIA

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ABSTRACT

This study examines the revolutionary nature of youth-based climate-smart agriculture (CSA) innovations in promoting resilient horticulture building in Nigeria, where climate change has become a serious threat to food security and rural well-being. Although horticulture has been of critical importance in supporting more than 70% of rural households' livelihoods, irregular weather patterns, poor infrastructure, and resource deprivation among smallholder farmers are on the rise. The study identifies emerging youth-led agribusiness enterprises using digital technology and agroecological approaches to overcome and outlines structural challenges, like land tenure insecurity and poor policy support, that are affecting youth involvement in horticultural practices. It further assesses the present practice of CSA, the consequences of youth-driven innovations and the policy framework required to drive an inclusive agricultural change. The study adopts a qualitative desk review research methodology conducted based on literature searches in different scholarly databases and corresponding policy papers published between 2020-2024. The study shows that the horticultural sector is experiencing a major loss of crops related to climatic conditions, which results in a 30-60% loss yearly. Systemic constraints to youth participation are few with respect to land tenure security (12%) and access to credit (<15%). Hence, the study identifies the opportunities of youth-driven CSA innovations in changing the face of the horticultural sector in Nigeria and creating resilience to climate change. The study recommends policy reforms, increased access to farmland, improved funding, adoption of climate-smart agriculture practices, and youth empowerment to support agritech startups and promote sustainable agricultural development.

Keywords: *Agritech, Climate-smart agriculture, Food security, Horticulture, Youth-driven innovations*

INTRODUCTION

With the world facing increased risks in climate conditions, there is a significant global impact on the stability of food systems in countries such as Nigeria. The rural livelihoods that depend on agriculture are becoming more and more exposed due to rising temperatures, unpredictable rainfall, droughts, and frequent flooding, all of which directly affect the smallholder systems which provide a bulk of food and rural jobs throughout the country. Two-thirds of rural households are reliant on agriculture, but the nature of climate variability has lowered the yield, planting season, and increased food insecurity (Obi-Egbedi et al., 2022). The lack of resources in the region worsens the crisis: desertification continues to spread across the north, while recurrent floods devastate southern states, destroying crops, displacing communities, and worsening shortages (Sambo, 2023). Such environment forces are combined with structural vulnerabilities, such as fragile economies, poor infrastructure, weak extension services, and fragmented climate policies that restrict access to resilient seeds, irrigation, storage and markets. Despite becoming a central development discourse, climate-smart agriculture (CSA) has been disproportionately implemented without considering the rural context and without integrating young people (Abiodun, 2022; Ifeanyi-Obi et al., 2022).

Through these struggles, Nigerian youths are becoming the most important innovators of CSA, using digital tools, agroecological systems, and community-based ideas, in the form of start-ups and grassroots projects. However, their contributions continue to be underfunded, insufficiently documented, and not appropriately incorporated into the national strategies, and challenges such as land inaccessibility, lack of credit, and inadequate representation in decision-making still exist (Ikebuaku, 2021). This review, therefore, evaluates the present condition of CSA in Nigeria, youth-led innovations, challenges and opportunities that may influence their participation, and how the policy, funding and knowledge systems facilitate or limit these activities. This review posits that youth-led innovation is important in reimagining climate-smart agriculture as a solution to transforming the rural food systems in Nigeria, enhancing national food security, and becoming part of global life strategies of developing resilience in the face of climate change.

The agricultural sector in Nigeria, which employs more than 70% of the rural population, has long been the cornerstone of food security and livelihoods, but it is now becoming disrupted by climate change. Increasing temperatures, unpredictable rainfall, desertification in the north, and frequent flooding of the south are altering the production systems and jeopardising the feasibility of smallholder production, which dominates the national output (Olajumake, 2020; Omokaro, 2025). Research reveals that climate change is reducing yields by up to 30-60% annually in certain regions (Oko et al., 2021), and horticultural farmers, especially tomato manufacturers in northern states,

complain of losses of up to 40% as a result of drought and heat stress (Oluchukwu et al., 2025). Similarly, the level of post-harvest losses is also very high, and the proportion of perishable crops that are discarded due to ineffective storage, transportation, and processing infrastructure is almost half of total production (Zailani, 2023). These challenges underscore the fact that the agricultural vulnerability in Nigeria is not only environmental but also highly institutionalised, shaped by poverty, ineffective infrastructure and weak governance systems.

CSA has become relevant in order to tackle these challenges to improve productivity, resilience, and mitigation. Nigeria has come up with the National Agricultural Resilience Framework and the Climate-Smart Agriculture Investment Plan (Okeke, 2023), but based on available evidence, the measures have also been disjointed, donor-reliant, and poorly executed. A lot of policies focus on cereals while marginalising horticulture, even though it is central to nutrition and employment. This policy-practice disjuncture represents what the Institutional Theory refers to as decoupling, where the global policy frameworks are symbolically adopted but are not well integrated into the local contexts (Jabbouri et al., 2022). The extension services that are supposed to act as the pipeline of the transfer of knowledge are underfunded, outmoded, and fail to efficiently link rural farmers to CSA innovations (Ameh et al., 2023). This is why critics believe that CSA will turn into a top-down technocratic agenda that replicates power imbalances and exclusion of local adaptation knowledge.

However, despite these structural constraints, Nigerian youth have started to transform the agrarian culture by creating innovations and enterprises. Young people, who represent a very high proportion of the population, are using digital tools, agroecological methods, and new business models to bring about adaptive farming solutions (ElDidi et al., 2020; Ogunleke & Idowu, 2025). These innovations generically include Farmcrowdy, Thrive Agric, and Hello Tractor, which have increased access to finance, mechanisation, and markets by up to 30% for smallholder farmers and reportedly increased yields and farmer incomes (Okpeke, 2024). Additional examples of grassroots digital innovations empowering real-time adaptation include mobile-based weather services and solar irrigation schemes (Abubakar et al., 2025). The Diffusion of Innovation Theory is informative in this context: young people act as early adopters, driving the adoption of CSA practices and technologies in the societies where traditional extension systems have failed. Yet, the theory points out, the social system determines the process of diffusion, and in Nigeria, systemic challenges, such as land tenure insecurity, poor access to credit, and exclusion in agricultural decision-making, impede the applicability of youth-led solutions.

These limitations may once again be attributed to the prevalence of the Institutional Theory, which emphasises that older, male farmers tend to be favoured by the established systems more than young people and women, being deprived of resources and decision-making processes (Amusan et al., 2021). This institutional inertia is a hindrance to the Nigerian capacity to utilise the demographic dividend in the transformation of agriculture. The resulting paradox, then, is that youth are the most adaptive, digitally literate, and possibly transformative participants in the CSA landscape in Nigeria, but they are structurally sidelined.

This literature thereby coalesces around three insights. To begin with, the food systems in Nigeria are experiencing increasing climate stress, which poses a threat, especially to horticulture, with devastating effects on food security. Second, the implementation of CSA is incomplete, localised, and technocratic, which only reproduces structural inequalities instead of decreasing them, although it is a promising framework. Third, innovations initiated by the youth have a great potential to contribute to adaptation and resiliency, but are compromised by the systemic factors that restrict their spread and institutional adoption. The synthesis of Diffusion of Innovation Theory and Institutional Theory, facilitated by the literature, renders it obvious that CSA in Nigeria cannot be implemented successfully with the help of technical fixes but needs institutional repositioning that would integrate youth-oriented initiatives into the policies. Devoid of conscious reforms that place young people in a new position, not as beneficiaries but as co-producers of resilient agricultural futures, CSA is in danger of remaining a rhetorical weapon instead of a groundbreaking avenue to food security and climate response.

METHODOLOGY

This review adopted a qualitative desk research review to explore CSA in the horticultural industry in Nigeria. A direct search of Google Scholar and policy documents, such as the National Agriculture Resilience Framework (NARF) developed under the Federal Ministry of Agriculture and Rural Development (FMARD), was carried out to find materials about CSA, youth entrepreneurship, and rural resilience published between 2020 and 2025. Data were obtained from FAO on crop losses, World Bank on agritech adoption, NBS on youth unemployment and poverty, and reports prepared by CBN on NIRSAL credit disbursement. The case studies of Farmcrowdy, Hello Tractor, ColdHubs, and AgroData were chosen purposely due to their popularity in CSA applications in the sphere of

horticulture, as well as the presence of performance data. The discussion is based on the Diffusion of Innovation Theory, which describes the way in which youth become early adopters and agents of spreading CSA practices, and the Institutional Theory, which has a direct effect on the effectiveness and scalability of these practices. It is a combination of this that allows a critical perspective on the intersection of youth-led innovation and institutional barriers to determine the future of CSA in Nigeria.

CONCLUSION AND RECOMMENDATIONS

This review has demonstrated that CSA innovations led by youths have the potential to offer a transformational solution to the Nigerian horticultural sector in improving resilience and sustainability, as well as rural livelihoods, but its success is hampered by systemic financial, institutional and infrastructural barriers. Based on the Diffusion of Innovation Theory, youth agripreneurship may be regarded as potential early adopters and drivers of change, yet their ability to lead to large-scale adoption of CSA requires enabling environments that facilitate legitimacy, trust and scalability. In the same vein, the Institutional Theory would shed light on the fact that, in the absence of coherence between regulatory, normative, and cultural-cognitive support, youth innovations risk staying fragmented and under-maximised.

On these insights, four overarching recommendations are promoted: (1) enhance youth access to affordable finance and credit programmes to reduce barriers to entry to innovation, thereby accelerating diffusion of innovation; (2) institutionalise youth-led models of CSA into the national and sub-national agricultural policies to enhance and strengthen institutional legitimacy and policy consistency; (3) increase technical training, digital infrastructure, and extension services to foster innovation adoption and diffusion, and (4) inculcate inclusive value chain relationships that link youth innovations with markets, research institutions, and development agencies. These measures would reinvent the youth as beneficiaries while also as key pillars to building a strong agricultural future for Nigeria.

REFERENCES

Abiodun, T. I. (2022). *Use of Climate Smart Agricultural Practices Among Smallholder Arable Crop Farmers of Nasarawa State, Nigeria* (Master's thesis, Kwara State University (Nigeria)).

Abubakar, A. K., Gillam, L., & Sastry, N. (2025). The Role of the Internet of Things (IoT) in Achieving the United Nations (UN) Sustainable Development Goals (SDGs)-A Systematic Review. *ACM Computing Surveys*.

Ameh, D. A., Sennuga, S. O., Bamidele, J., Osho-Lagunju, B., & Abdulahi, R. O. (2023). Linkage Behavior and Practices of Agencies in the Agricultural Innovation Transfer Sub System in Nigeria: Issues for Agricultural Extension policy. *Journal of Agriculture & Education Research*, *1*(1), 1-6.

Amusan, L., Akokuwebe, M. E., & Odularu, G. (2021). Women's development in agriculture as an agency for fostering innovative agricultural financing in Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, *21*(7), 18279-18299.

ElDidi, H., Bidoli, T., & Ringler, C. (2020). *Agriculture and youth in Nigeria: Aspirations, challenges, constraints, and resilience* (Vol. 1946). Intl Food Policy Res Inst.

Hussain, S., Amin, A., Mubeen, M., Khaliq, T., Shahid, M., Hammad, H. M., ... & Nasim, W. (2021). Climate-smart agriculture (CSA) technologies. In *Building climate resilience in agriculture: Theory, practice and future perspective* (pp. 319-338). Cham: Springer International Publishing.

Ifeanyi-Obi, C. C., Issa, F. O., Aderinoye-Abdulwahab, S., O. Ayinde, A. F., Umeh, O. J., & Tologbonse, E. B. (2022). Promoting uptake and integration of climate-smart agriculture technologies, innovations and management practices into policy and practice in Nigeria. *International Journal of climate change strategies and management*, *14*(4), 354-374.

Ikebuaku, K. (2021). Youth agricultural entrepreneurship as a vehicle for employment creation in Nigeria: A capability approach.

Jabbouri, R., Schneckenberg, D., & Truong, Y. (2022). From policy-practice to means-ends decoupling in organisations: A systematic review and paths for future research. *Management international*, *26*(1), 123-148.

Obi-Egbedi, O., Hinmikaiye, R. O., & Balogun, O. L. (2022). Climate Change Adaptive Livelihood Diversification Strategies and Food Security of Crop Farming Households in Rural Oyo State, Nigeria. *Nigeria Agricultural Journal*, *53*(2), 289-296.

Ogunleke, A., & Idowu, F. O. (2025). Climate-Smart Agriculture and Youth

Empowerment. *Available at SSRN 5172794*.

Okeke, C. U. (2023). Community resilience: integrating local approaches into Nigeria's climate change adaptation agenda. *Policy Brief*, *23*(06).

Okon, E. M., Falana, B. M., Solaja, S. O., Yakubu, S. O., Alabi, O. O., Okikiola, B. T., ... & Edeme, A. B. (2021). Systematic review of climate change impact research in Nigeria: implications for sustainable development. *Heliyon*, *7*(9).

Okpeke, A. S. (2024). Technological Advancement in Agriculture and its Importance: The Nigerian Perspective. *Akwapoly Journal of Communication & Scientific Research*, *8*(1).

Olajumake, A. L. (2020). *Assessment of Effects of Climate Change on Food Security Among Farmers: A Case Study of Some Selected Communities in Edu Local Government, Kwara State* (Master's thesis, Kwara State University (Nigeria)).

Oluchukwu, D. J., Ozoemene, M. L., Chidimma, D. N., & Happiness, O. O. (2025). Climate Variability and Its Effect on Tomato Yield in Nigeria.

Omokaro, G. O. (2025). Multi-impacts of climate change and mitigation strategies in Nigeria: agricultural production and food security. *Science in One Health*, 100113.

Sambo, U. (2023). Impact of climate change on food security in Northern Nigeria.

Zailani, S. M. (2023). *Exploring post-harvest losses and waste in tomato supply chains: Insights from Kaduna State, Nigeria* (Doctoral dissertation, University of Nottingham (United Kingdom).

SOCIOECONOMIC POTENTIALS OF LIVESTOCK DEVELOPMENT AMONG LIVESTOCK FARMERS IN OYO AND NIGER STATES, NIGERIA

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ABSTRACT
Livestock production is a very important segment of agriculture; it plays a key role in global food systems as the main source of animal protein. This study assesses the socio-economic potentials of livestock development in Oyo and Niger States. Structured questionnaires were used to elicit information based on respondents' socio-economic characteristics, enterprise characteristics of livestock farmers, enabling circumstances affecting livestock development, extent of involvement in diverse livestock activities, constraints faced by livestock farmers and perceived potential of livestock development in the study area. Multi-stage sampling procedure was used, selecting two hundred and fourteen (214) livestock (poultry, sheep, goat and cattle) farmers' four community leaders and policy makers. Frequency count, percentages and mean were used for the data analysis while Chi-square, Spearman rho, Pearson Product Moment Correlation and Independent t-test were used to test for hypotheses of the study. Result showed mean age of respondents was 43.58±14.32years. Majority were male (68.7%), married (68.2%), Muslim (55.1%) and 45.8% had secondary education. While 70.6% had 5-8 household size. More (53.7%) than half had access to enabling circumstances. Prominence constraints faced indicate insufficient capital ($\bar{x}$=1.65), access to funding ($\bar{x}$=1.65) and feeding cost ($\bar{x}$=1.63), while 55.1% had unfavourable perceived potential. Furthermore, there was significant relationship between monthly income (r=0.222, p=0.001) and perceived potential of livestock development ($\bar{x}$=46.56). There is a significant difference between Oyo state (t=116.106, p=0.000) and Niger state (t=101.975, p=0.000). It recommends that access to funding should be made available through formation of cooperative society
Keywords: Livestock, Livestock development and perceived potential

INTRODUCTION

Livestock plays a key role in global food systems as the main source of animal protein (milk, meat and eggs), contributes to crop productivity through the provision of draught power and manure, and to the livelihoods and nutrition of poor households in low-and middle-income countries (Robinson *et al.,* 2018). Livestock production is a very important segment of agriculture. It is referred to as one or more domesticated animals raised in agricultural settings to produce commodities such as food, fiber and labour. Apart from providing food, it serves as a source of employment and income generation to rural farm families. Livestock may be raised for subsistence or for profit (Enechi, e*t al.*, 2019). Livestock not only plays a significant role in the socio-cultural aspects of the people but also, helps to balance human nutrition (Adam *et al.*, 2018).

Nigeria has population of about 34.5 million goats, 22.1 million sheep and 13.9 million cattle (Lawal-Adebowale, 2019). The larger proportion of these animals' population are however largely concentrated in the northern region of the country than the southern part. Specifically, about 90 percent of the country's cattle population and 70 percent of the sheep and goat populations are concentrated in the northern region of the country. Concentration of Nigeria's livestock-based in the northern region is most likely to have been influenced by the ecological condition of the region which is characterized by low rainfall duration, lighter sandy soils and longer dry season (Lawal-Adebowale, 2019). The Federal Government acknowledge the Country's livestock sector has a huge economic potential worth N33 trillion that should be explored and harnessed. In view of the above, the assessment of socioeconomic potentials of livestock development among livestock farmers in Oyo and Niger state hence become crucial.

Objectives of the study are to:

1. identify the socio-economics characteristics of respondents in the study area
2. examine the enabling circumstances affecting livestock development in the study areas
3. examine the constraints faced by livestock farmers in Oyo and Niger State
4. assess the perceived potential of livestock development in the study areas

The study hypothesis is that there is no significant difference in the enabling circumstances affecting the perceived potentials of livestock development of Oyo State and Niger State

METHODOLOGY

The study was conducted in Oyo and Niger states. Primary data was obtained from the questionnaire. Multi-stage sampling procedure was used to select two hundred and fourteen (214) livestock (poultry, sheep, goat and cattle) farmers, four community leaders and policy makers

RESULTS AND DISCUSSION

Socioeconomics characteristics

Results in Table 1 revealed that the mean age of livestock farmers in both states is 43.58±14.32, which implies that majority of the respondents are in the productive age. With respect to sex most of the

respondents are Male (68.7%) while less than half are Female (31.3%).

The study also revealed that 68.2% of the livestock farmers are married, while 55.1% of the respondents are Muslim.

Results from the findings also shows that 45.8% of respondents had secondary education of 12 years, while 70.6% of respondents had a family size of 5-8 people.

Table 1: Socio demographic distribution of Livestock stakeholders in Oyo and Niger State (n=214)

Variables	Frequency	Percentage (%)	Parameter
Location			
Ido	54	25.2	
Akinyele	55	25.7	
Bida	52	24.3	
Suleja	53	24.8	
Age			
17-26	30	14.0	
27-36	40	18.7	Mean = 43.58
37-46	58	27.1	S. D = 14.32
47-56	38	17.8	
57-66	37	17.3	
67-76	11	5.1	
Gender			
Male	147	68.7	Mode = Male
Female	67	31.3	
Marital Status			
Single	42	19.6	
Married	146	68.2	Mode = Married
Widowed	14	6.5	
Divorced	12	5.6	
Religion			
Christianity	90	42.1	
Islam	118	55.1	Mode = Islam
Traditional	6	2.8	
Years of Education			
None/No formal (0)	41	19.2	
Primary (6)	33	15.4	
Secondary (12)	98	45.8	
BSc/HND	32	15.0	
Masters	10	4.7	
Household Size			
1-4	35	16.4	
5-8	151	70.6	Mean = 6.46
9-12	22	10.3	S.D = 2.290
13-16	6	2.8	

Enabling Circumstances Affecting Livestock

Series of enabling circumstances affecting livestock were generated on enabling circumstances affecting livestock and result obtained was categorized into enabling and not enabling with the use of mean score. More than half of respondents have access to enabling circumstances to livestock development (53.7%) while few of the respondents have non-enabling circumstances towards livestock development in the study area (46.3%). This shows that respondents were enabled more to livestock development, and if there are more enabling circumstances with access, livestock farmers will tap in more to the potentials of livestock farmers

Table 2: Categorization of enabling circumstances of livestock potential, n=214

Categorization of Enabling circumstances	Frequency	Percentage	Minimum value	Maximum value	Mean±S.D
Not Enabling	99	46.3	3	25	14.97±4.81
Enabling	115	53.7			

Constraints faced by livestock farmers in the study area

Results revealed that the three most prominence constraints faced by respondents indicate Insufficient capital, access to funding ranked highest with average mean of $\bar{x}$ = 1.65, feeding cost of average mean of $\bar{x}$ = 1.63 and Diseases of average mean of $\bar{x}$ = 1.51. This can be buttressed with the statements made by some of the livestock farmers that:

"*... It is not easy to have access to credit, many procedures and collateral is needed before access to credit*" (Bida LGA and Suleja LGA, Niger, 2024). Not easy here implies it takes four to six months before credit can be accessed.

"*….the feed cost is high and not easy affordable making use of other feeds available and accessible that is affordable* (Ido LGA and Akinyele LGA, Oyo, 2024)."

Table 3: Constraints faced by livestock farmers in the study area

Constraints	Severe Constraint (%)	Mild Constraint (%)	Not a Constraint (%)	Mean ($\bar{x}$)	Rank
Insufficient capital and access to funding	148(69.2)	57(26.6)	9(4.2)	1.65	1st
Feeding cost	143(66.8)	63(29.4)	8(3.7)	1.63	2nd
Diseases	120(56.1)	84(39.3)	10(4.7)	1.51	3rd
Feeding availability	114(53.3)	81(37.9)	19(8.9)	1.44	4th
Inadequate access to credit facilities	71(33.2)	131(61.2)	12(5.6)	1.28	5th
Pilfering, Stealing or theft	72(33.6)	104(48.6)	38(17.8)	1.16	6th
Access to Veterinary services	42(19.7)	135(63.1)	37(17.3)	1.02	7th
Inadequate extension service on livestock management	25(11.7)	164(76.6)	25(11.7)	1.00	8th
Inadequate information on livestock management	22(10.3)	161(75.2)	31(14.5)	0.96	9th
Lack of extension visit	24(11.2)	148(69.2)	42(19.6)	0.92	10th
Limitations due to Gender barrier	44(20.6)	96(44.9)	74(34.6)	0.86	11th
Lack of recommended strain of animals	19(8.9)	136(63.6)	59(27.6)	0.81	12th

Categorization of the perceived potential of livestock farmers in the study areas

Findings reveal that more than half of respondents were unfavourable disposed to the perceived potentials of livestock development (55.1%) while few of the respondents have favourable perception towards livestock development in the study area (44.9%) based on the mean score.

Table 4: Categorization of the perceived potential of livestock farmers in the study areas (n=214)

Categorization of perceived potential	Frequency	Percentage	Minimum value	Maximum value	Mean±S.D
Unfavourable	118	55.1	33	55	46.57±4.45
Favourable	96	44.9			

T test of difference between perceived potentials of livestock development in Oyo and Niger State

The result of the hypothesis shows a significant difference between Oyo state and Niger state (t=116.106, p=0.00) (t=101.975, p=0.00). This implies that there is a difference between the perceived potentials of livestock development in Oyo and Niger States.

Table 5: T test of difference between perceived potentials of livestock development in Oyo and Niger State

Variable	t	df	p-value	Decision
Oyo state	101.975	104	0.000**	Significant
Niger state	116.106	108	0.000**	Significant

RECOMMENDATIONS

The following are recommended:

1. The need for all stakeholders to invest in Infrastructures such as veterinary facilities, feed mills, marketing infrastructure etc.
2. Livestock specialists and livestock farmers should provide Capacity Building such as training and capacity-building programs for livestock farmers, focusing on best practices in animal husbandry and management.
3. Financial funds should be released to ensure farmer access to loans and credit facilities

REFERENCES

Adam H., Atengdem P.B. and Al-hassan S. (2018): Innovations adoption levels of small ruminant farmers in Tolon-Kumbungu

district of Ghana. *Ghana Journal of Development Studies* 7 (2), 39-66

Enechi G.N., Akinnagbe O.M. and Ajayi A.R. (2019): Assessments of livestock production system under climate change among farm–family in Nsukka Local Government Area of Enugu State. Published in Proceedings of the 17th Annual Conference of Agricultural Extension Society of Nigeria (AESON) 2012, pp. 5

Lawal-Adebowale, O. A. (2021): Factors Influencing Small Ruminant Production in Selected Urban Communities of Abeokuta, Ogun State. Nigerian Journal of Animal Production, 39 (1): 218 – 228.

Robinson, T. et al (2018): Global livestock production systems. 152 pp. Mapping the Global Distribution of Livestock. PLoS ONE 9, e96084 (2014).

USE OF NEW MEDIA IN INFORMATION SOURCING AMONG POULTRY FARMERS IN IBADAN, OYO STATE

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ABSTRACT
The rapid advancement of new media platforms has emerged as a significant agricultural information technology, enabling poultry farmers to communicate directly with the public. The study examined the utilisation of new media in information sources among poultry farmers in Ibadan, Oyo state. Multi-stage sampling procedure was used to select one hundred and twenty-two (122) respondents. Data was collected through the use of structured questionnaires covering respondents' socioeconomic characteristics, awareness and accessibility of new media platforms, relevance of information available for poultry production and utilisation of new media to source information on poultry production. Descriptive and inferential statistics were used to test the hypotheses. Results show that the mean age of respondents was 45.0+3.25years, 60.7% were male, 72.1% were married, 66.4% had tertiary education, 59.8% were Christians and 36.9% earn above 100,000. Majority (79.5%) had high awareness of new media and were highly accessible to most new media platforms, 54.1% found information on new media very relevant and 63.1% of respondents were faced with erratic power supply while majority 68.0% of respondents revealed that WhatsApp was the most utilised new media for information sourcing on production and marketing of poultry products. Furthermore, there was significant relationship between respondents age (r=-0.227, p=0.012), educational attainment (r=0.301, p=0.001) and utilisation of new media.
Respondents level of awareness (r=0.654, p=0.001), accessibility (r=0.773, p=0.001), relevance (r=0.572, p=0.001) were correlated with utilisation of new media in information sourcing. It is recommended that infrastructure for the new media that respondents utilise for sourcing information should be intensified.
Keywords: New media, poultry production, information sourcing

INTRODUCTION

Agriculture stands as a cornerstone of economic and social progress in many developing nations. Access to high-quality information is pivotal for advancing all facets of agricultural activity. The efficacy of any farming endeavor hinges largely on the caliber of information accessible and employed by farmers. Poultry farmers, integral to food production, play an invaluable role. Their participation in agriculture is driven foremost by the desire to ensure household food security and generate income, underscoring their pivotal role in sustaining both economic stability and community welfare. Poultry farming makes up an integral part of Nigeria's livestock industry. Poultry plays a vital role in enhancing human nutrition and ensuring food security by providing high-quality protein through eggs and meat. It serves as a crucial supplement to income from crops and other livestock, helping to reduce reliance on traditional commodities with fluctuating prices. Additionally, poultry has significant potential to boost foreign exchange earnings by exporting products to neighboring countries (NAADS, 2011). A key strategy to amplify poultry production in the country is through effective information dissemination, management, and utilisation (Fawole, 2006). Nigeria's poultry industry has seen tremendous growth over the past two decades, driven by surging demand for eggs and meat. The poultry sector contributes about 25–30% of Nigeria's agricultural GDP. With over 200 million people and a fast-growing middle class, Nigeria's large and attractive market makes poultry farming highly profitable. As of recent data, Nigeria has approximately 200,000 poultry farmers.

New media encompasses digital platforms such as social media, websites, mobile applications, blogs, and online forums, offering interactive and real-time communication. The relevance of The New Media to poultry farmers includes; provision of immediate access to up-to-date information on poultry management, disease control, and market prices (Olaniyi & Ismaila, 2016), enabling farmers to connect with peers and experts globally (Adejo & Haruna, 2009), offering practical training through online videos, webinars, and e-learning courses (Akinbile & Ndaghu, 2005), facilitation of direct marketing, reducing intermediaries and enhancing profitability (Oluwatayo & Omotayo, 2012), and provide help in collecting and analysing data for improved decision-making (Agwu & Murray, 2015). Despite its benefits, the adoption of new media faces challenges which includes; limited access to the internet and digital devices in rural areas (Okwu & Umoru, 2009), many farmers lack the skills to use digital tools effectively (Nwafor& Ejike, 2017), need for localized and context-specific information tailored to Nigerian poultry farmers (Musa et al., 2012). However, opportunities to overcome these challenges includes; improving infrastructure, enhancing digital literacy through training and developing localized content (Oladele & Kareem, 2003; Adomi et al., 2003). In view of the above, the assessment of the utilisation of new media in meeting the information needs of poultry farmers in Ibadan hence become crucial.

Objectives of the study:

1. To identify the socioeconomic characteristics of poultry farmers in the study area.

2. To examine the relevance of information available on the new media platforms for meeting poultry information needs of poultry farmers in the study area.
3. To ascertain the types of new media accessible to poultry farmers in the study area.
4. To identify the constraints hindering poultry farmers from effectively utilising new media platforms in the study area.
5. To ascertain the level at which new media is utilised by poultry farmers in meeting poultry information needs in the study area.

The hypothesis of the study is that there is no significant relationship between the new media technologies accessible to the respondents and their utilisation of new media.

METHODOLOGY

The study area for this research was Oyo State, Nigeria. Primary data was obtained questionnaire. Multi-stage sampling procedure was used to select 122 poultry respondents. Data collected was analysed using descriptive and inferential statistical techniques.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

The results in Table 1 reveals that 60.7% of the respondents were male, and 39.3% were female. This indicates a higher representation of male poultry farmers in the sample. Similarly, age group among the poultry farmers is 35-44 years, accounting for 36.1% of the respondents with the mean age of respondents 45.0 $\pm$ 3.25 years. This implies that majority of the respondents are young adults who possess the strength to be involved in poultry production. The result further shows that 59.8% of respondents identify as Christian, 36.9% as Muslim, and 3.3% practice Traditional religion. Similarly, majority (72.1%) of the respondents were married.

Table 1 further reveals that (36.9%) of the respondents earned above 100,000 Naira per week with an average annual income of ₦35550.62. Similarly, 4.9% of respondents had primary education, 28.7% had secondary education, and 66.4% had tertiary education. Result further show that 32.8% of the respondents had 6-10 years of farming experience which implies most farmers had average years of experience in poultry farming

Table 4.1.: Socio economic characteristics of the respondents (n=122)

Variables	Frequency	Percentage (%)	Parameter
Age			
28-34	23	18.9	
35-44	44	36.1	Mean = 45
45-54	38	31.1	S. D = 3.25
55-64	14	11.5	
65-70	3	2.5	
Gender			
Male	74	60.7	
Female	48	39.3	Mode = Male
Religion			
Christianity	73	59.8	
Muslim	45	36.9	Mode = Christianity
Traditional	4	3.3	
Marital Status			
Single	25	20.5	
Married	88	72.1	Mode = Married
Divorced	4	3.3	
Widowed	4	3.3	
Separated	1	0.8	
Educational Attainment			
Primary Education	6	4.9	
Secondary Education	35	28.7	Mode = Tertiary Education
Tertiary Education	81	66.4	
Estimated weekly income			
21,000-40,000	14	11.5	
41,000-60,000	20	16.4	
61,000-80,000	12	9.8	Mean = 35550.62
81,000-100,000	26	21.3	
Above 100,000	45	36.9	
Below 20,000	5	4.1	

Source: Field Survey, 2024

New media accessible to poultry farmers in the study area

New media accessible to poultry farmers in the study area were presented in Table 3. It was revealed that For Facebook, 43.4% of respondents find it very accessible, 41.8% find it partially accessible, 9.0% find it accessible, and 5.7% find it not accessible. This indicates that Facebook is generally accessible to the majority of respondents, with varying levels of accessibility. Regarding Google, 16.4% of respondents find it not accessible, 13.1% find it accessible, 41.0% find it partially accessible, and 29.5% find it very accessible. This suggests that Google is generally accessible to most respondents, though with varying degrees of ease. For WhatsApp, 45.1% of respondents find it very accessible, 38.5% find it partially accessible, 9.8% find it accessible, and 6.6% find it not accessible. Overall, WhatsApp is seen as accessible by the majority of respondents, with different levels of accessibility. Lastly, for E-Books, 43.4% of respondents find them not accessible, 25.4% find them partially accessible, 15.6% find them accessible, and another 15.6% find them very accessible. This indicates that a significant portion of respondents find E-Books to be less accessible.

Table 3: New media accessible to poultry farmers in the study area

New media platforms	Not accessible	Accessible	Partially Accessible	Very Accessible	x̄	Rank
Facebook	7(5.7%)	11(9.0%)	51(41.8%)	53(43.4%)	3.23	1st
Google	20(16.4%)	16(13.1%)	50(41.0%)	36(29.5%)	2.84	3rd
WhatsApp	8(6.6%)	12(9.8%)	47(38.5%)	55(45.1%)	3.22	2nd
YouTube	31(25.4%)	19(15.6%)	38(31.1%)	34(27.9%)	2.61	4th
EBook	53(43.4%)	19(15.6%)	31(25.4%)	19(15.6%)	2.13	5th
Online Radio	50(41.0%)	28(23.0%)	25(20.5%)	19(15.6%)	2.11	6th

Source: Field Survey, 2024

Constraints hindering poultry farmers from effectively utilising new media platforms in the study area

The result in Table 4 revealed that the two most prominence constraints faced were erratic power and Poor network coverage with average mean of $\bar{x}$ = 2.54, and $\bar{x}$ = 2.33.

Table 4: Constraints hindering utilisation of new media

New media platforms	Not a Constraint	Mild Constraints	Severe Constraint	$\bar{x}$	Rank
Erratic Power Supply	11(9.0%)	34(27.9%)	77(63.1%)	2.54	1st
Poor Network Coverage	8(6.6%)	66(54.1%)	48(39.3%)	2.33	2nd
Lack of Android Device	87(71.3%)	31(25.4%)	4(3.3%)	1.32	8th
Cost of buying data	74(60.7%)	39(32.0%)	9(7.4%)	1.47	4th
Lack of formal education	90(73.8%)	28(23.0%)	4(3.3%)	1.30	10th
Illiteracy	88(72.1%)	31(25.4%)	3(2.5%)	1.30	10th
Poor Adoption of technological innovation	78(63.9%)	34(27.9%)	10(8.2%)	1.44	5th
Lack of self-confidence	84(64.9%)	37(30.3%)	1(8.0%)	1.32	8th
Misinformation	32(26.2%)	68(55.7%)	22(18.0)	1.92	3rd
Complexity of gadget	78(63.9%)	37(30.3%)	7(5.7)	1.42	6th
Lack of digital skills	81(66.4%)	34(27.9%)	7(5.7)	1.39	7th

Source: Field survey, 2024

Pearsons' correlation results between the types of new media technologies accessible to the respondents and their utilisation of new media.

The result of the hypothesis, in Table 5, shows a statistically significant positive correlation between accessibility and utilisation of new media among respondents ($r = 0.773$, $p < 0.001$). This indicates that as accessibility to new media increases, utilisation of these media also increases.

Table 5: **Pearson's correlation results between accessibility of new media technologies and their utilisation**

Variable	r-value	p-value	Decision
Accessibility	0.773	<0.001	Significant

Source: Field Survey, 2025

CONCLUSION AND RECOMMENDATIONS

It is concluded that new media platforms are easily accessible to a higher percentage of the respondents. New media platforms that most of the respondents find very relevant are WhatsApp, while Facebook, Google and YouTube are relevant. The utilisation of new media was significantly related to respondents' socio-economic characteristics, awareness levels, accessibility to different platforms, the relevance of information to poultry production needs, and the challenges associated with using new media. It was therefore recommended that:

1. Infrastructure for the new media that respondents utilise for sourcing information should be intensified (Facebook, WhatsApp, Google and YouTube), while they be encouraged to use the ones that are not presently in use (Online radio and E-books)
2. Poultry farmers should be made fully aware of the benefits of utilising new media technologies in meeting their agricultural information needs through sensitization programs, workshops and training sessions. This will help foster a positive attitude towards utilising new media and encourage adoption of new media for agricultural production.

REFERENCES

Adejo, P. E., & Haruna, U. (2009). Access of farmers to agricultural information in Kogi State, Nigeria. Research Journal of Agriculture and Biological Sciences, 5(3), 338-342.

Adomi, E. E., Ogbomo, M. O., & Inoni, O. E. (2003). Gender factor in crop farmers' access to agricultural information in rural areas of Delta State, Nigeria. Library Review, 52(8), 388-393.

Agwu, A. E., & Murray, P. J. (2015). Use of information communication technologies (ICTs) by agricultural extension workers in Nigeria. Journal of Agricultural Extension, 9(1), 1-14.

Akinbile, L. A., & Ndaghu, A. A. (2005). Access and use of information and communication technology (ICT) among extension officers and farmers in Adamawa State, Nigeria. Journal of Agricultural Extension, 8, 1-10.

Musa, I. H., Olaleye, M. O., & Akinbile, L. A. (2012). Effectiveness of agricultural information dissemination in Ondo State, Nigeria. International Journal of Agricultural Economics and Extension, 1(5), 23-29.

Nwafor, C. E., & Ejike, R. U. (2017). Digital literacy among agricultural extension officers in Imo State, Nigeria. International Journal of Agricultural Research, 12(2), 98-105.

Okwu, O. J., & Umoru, B. I. (2023). Assessment of smallholder poultry farmers' use of information and communication technologies (ICTs) in Kwali Area Council of Abuja, Nigeria. International Journal of Agricultural Extension and Rural Development, 10(3), 145-153.

Oladele, O. I., & Kareem, R. O. (2003). Adoption rate and continued use of selected Arable Crop Technologies among Farmers in Nigeria. Tropical Agricultural Research and Extension, 6, 1-8.

Olaniyi, O. A., & Ismaila, A. B. (2016). Challenges and prospects of using new media for agricultural extension services in Nigeria. Journal of Agricultural Extension, 20(2), 61-72.

Oluwatayo, I. B., & Omotayo, A. O. (2012). New media and agricultural extension in Nigeria: Experiences from selected states. Journal of Agricultural Extension, 16(2), 1-12.

UTILISATION OF RICE PRODUCTION TECHNOLOGIES AMONG RICE FARMERS IN THE NATIONAL CEREALS RESEARCH INSTITUTE'S ADOPTED VILLAGES, BADEGGI, NIGER STATE, NIGERIA.

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ABSTRACT
This study examined the adoption of rice production technologies among rice farmers in the villages served by the National Cereals Research Institute in Badeggi, Niger State. The study outlined the socioeconomic characteristics of the rice farmers and determined their level of adoption. Using a well-designed questionnaire, data were collected from 140 rice farmers through a three–stage sampling process and analysed using both descriptive (frequency, percentage, mean, and ranking) and inferential (chi-square) statistics. Results showed that 89% of the farmers were male, 47.3% were over 50 years old, and about 98.0% had contact with an extension agent. The most commonly adopted improved rice technologies included Faro 44 ($\bar{x}$ 2.4), and NPK 20-20-20 ($\bar{x}$ 2.4), while the appropriate seed rate ($\bar{x}$ 1.6) was not frequently used. Farmers were aware of and had adopted some of the improved rice technologies. To promote adoption, messages should be disseminated on time through suitable channels, considering their cultural relevance.
Keywords: Effective dissemination methods, level of awareness, and constraints.

INTRODUCTION

Agriculture plays a vital role in the Nigerian economy and is a critical source of growth for many developing countries. It provides livelihoods for the rural population and offers investment opportunities by supplying raw materials and strengthening these economies (Ovansa et al., 2015; Osabohien et al., 2019; Pawlak et al., 2020). Rice is a significant staple crop in Nigeria's agricultural policy and a crucial component of the agricultural sector. Studies indicate that approximately 480 million metric tons of milled rice is produced annually, with around 513.8 million metric tons produced in 2022 (USDA, 2024). China (148,990,000 metric tons) and India (129,000,000 metric tons) together account for nearly 50% of total annual rice production (WEF 2022; FAO, 2022). Over the past two decades, achieving self-sufficiency in rice production has been a key focus of food policy for successive governments. Several intervention programs have been launched to enhance domestic rice production and reduce the import gap, contributing to improved rural livelihoods, food security, and socio-economic development (Lawal et al., 2014; Danso-Abbeam et al., 2018). Effective dissemination of agricultural technology is crucial for achieving these goals among rural farmers. However, in Nigeria, the dissemination of agricultural technology to farmers is inadequate (Lawal et al., 2014; Oyindeinbofa, 2017). Many farmers do not experience the benefits of farming innovations due to a lack of access or poor communication. This challenge has become a significant constraint to agricultural development and has hindered the advancement of modern farming practices in Nigeria. Therefore, it is essential to evaluate the effectiveness of technology dissemination on rice production in the villages adopted by the National Cereals Research Institute in Badeggi, Niger State.

The broad objective was to examine the adoption of rice production technologies among rice farmers in the villages served by the National Cereals Research Institute in Badeggi, Niger State. The specific objectives were to;

1. Describe the socioeconomic characteristics of rice farmers in the study area
2. Determine the effectiveness of dissemination methods among the beneficiaries in the study area.

METHODOLOGY

The study was carried out in two of the National Cereals Research Institute's adopted villages in Badeggi in Katcha LGA, Niger State. A multi-stage sampling technique was employed. The first stage was to purposely select Katcha LGA among the three other LGAs in Niger State where rice crop is extensively produced under lowland and upland ecology. And are also leading areas of (NCRI) activities. Then the selection of Badeggi, thirdly was to randomly select 2 adopted villages among the villages adopted by NCRI. From the list of rice farmers in these villages, 75 rice farmers were randomly selected, making a total of 150 respondents for the sample size. A structured questionnaire was designed and used, descriptive statistics. (frequency, percentages, mean) was used to analysis the data collected.

RESULTS AND DISCUSSION

Result in Table 1 reveals that 89% of rice farmers are male, indicating that male-dominated industry. This aligns with Ameh and Lee (2022), who found that 65% of rice farmers in Nigeria are men. Most respondents (47.3%) are over 50 years old, suggesting they are experienced and knowledgeable about rice farming. Osuafor et al., (2018) also noted a similar average age among farmers. Additionally,

about 89% of respondents are married, consistent with findings from Ameh and Lee, (2022) and Onumadu and Osahon, (2014). Approximately 43% have some form of education, as noted by Audu and Aye, (2014). Farmers (98%) reported regular contact with extension agents from the (N C R I). This supports Audu and Aye (2014), who highlighted the importance of extension contact for accessing improved agricultural practices.

Table 1: Socioeconomic characteristics of respondents

Variables	Frequency	Percentage
Sex		
Male	125	89
Female	15	11
Age		
<20	4	3
21-35	10	7
36-50	50	36
51-65	70	50
Above 65	6	4
Marital status		
Single	10	7
Married	125	89
Widowed	3	2
Divorced	2	1
Educational level		
No Formal Education	80	57
Primary/JSS	15	11
Secondary	25	18
Tertiary	20	14
Household size		
< 3	9	6
4 - 6	11	8
Above 6	120	86
Years of farming experience		
< 10	2	1
11- 20	18	13
21- 30	40	29
Above 30	80	57
Farm size		
Below 5	10	7
6- 10	110	79
11- 15	13	9
Above 15	7	5
Land acquisition methods		
Owned	110	79
Not owned	30	21
Cooperative group/association		
Yes	135	96
No	5	4
Frequency of contact with the extension agent		
Often	137	98
Occasional	3	2

Source: Field survey 2025

The most commonly adopted practices include the use of Faro 44 ($\bar{x}$ 2.4), NPK 20-20-20 ($\bar{x}$ 2.4), land ploughing ($\bar{x}$ 2.3), and mechanical threshers ($\bar{x}$ 1.6) are used occasionally, while winnowing machines are rarely utilised. Aloko, (2015) reported similar findings, noting that fertilizer application, seed treatment, and pest control are among the most adopted technologies. Ademiluyi, (2014) added that farmers are more likely to adopt technologies when they recognize significant benefits.

Table 2. Extent of adoption of improved rice production technologies among farmers

Variables	Always (%)	Sometimes (%)	Rarely (%)	Mean	Rank
Plough	66 (48.4)	55 (39.3)	20 (14.3)	2.3	5th
Arrow	45 (32.1)	75 (53.6)	20 (14.3)	2.2	8th
Faro 44	85 (60.7)	25 (17.9)	30 (21.4)	2.4	1st
NPK 20 20 20	90 (64.3)	15 (10.7)	35 (25.0)	2.4	1st
Urea	70 (50)	30 (28.6)	40 (28.6)	2.2	8th
Glyphosate	35 (39.3)	45 (32.1)	40 (28.6)	2.1	9th
appropriate planting date	76 (54.3)	34 (24.3)	30 (21.4)	2.3	5th
appropriate seed rate	30 (21.4)	20 (14.3)	90 (64.3)	1.6	11th
appropriate plant spacing	20 (14.3)	35 (25.0)	85 (60.7)	1.5	13th
timely harvesting	74 (52.9)	36 (25.7)	30 (21.4)	2.3	5th
Integrated pest management strategies	15 (10.7)	55 (39.3)	70 (50.0)	1.6	11th
mechanical thresher	20 (14.3)	45 (32.1)	70 (50.0)	1.6	11th
Winnowing machine	10 (7.1)	35 (25.0)	95 (67.9)	1.4	14th
Milling machine	80 (57.1)	25 (17.9)	35 (25.0)	2.3	5th

CONCLUSION AND RECOMMENDATION

Conclusively, the majority of the farmers indicated awareness of the technologies introduced by the (N C R I). The most common improved rice technologies that the farmers always adopt were: the use of Faro 44, NPK 20 20 20 etc. The following recommendations will go a long way to improve their adoption level. Extension agents should be motivated in order to intensify their efforts by giving farmers training and advisory services using widely accepted information dissemination methods which would be very effective and efficient to utilise.

REFERENCES.

Ademiluyi, I.O. (2014). Adoption of Improved Maize Varieties among Farmers in Bassa Local Government Area of Plateau State, Nigeria. *International Journal ofInnovative Agriculture & Biology Research* 2 (4):26-33.

Aloko, A.B. (2015). Effects of Adoption of Striga Resistant Maize Production Technologies on Farmers' Livelihood in Kajuru Local Government Area, Kaduna State, Nigeria. M.Sc. thesis submitted to the Department of Agricultural Economics and Rural Sociology Faculty of Agriculture Ahmadu Bello University, Zaria. pp 89-95.

Ameh, M. and Lee, S.H. (2022). Determinants of Loan Acquisition and Utilisation among Smallholder Rice Producers in Lagos State, Nigeria. *Sustainability* 14: 3900-3906

Audu, VI and Aye, G C. (2014). The effects of improved maize technology on household welfare in Buruku, Benue State, Nigeria, Cogent Economics & Finance, *Taylor & Francis, Abingdon,* 2(1): 1-10

Danso-Abbeam, G., Ehiakpor, D.S and Aidoo, R. (2018). Agricultural extension and its effects on farm productivity and income: insight from Northern Ghana. *Agriculture & Food Security* 7: 74-79.

Lawal, I.S., Boadi, B.Y., Oladokun, O. and Kalusopa, T. (2014). The Generation and Dissemination of Agricultural Information to Farmers in Nigeria: A Review. *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS).* 7 (2): 102-111

Onumadu, F. N. and Osahon, E. E. (2014). Socio-economic determinants of adoption of improved rice technology by farmers in Ayamelum Local Government Area of Anambra State, Nigeria. *International Journal of Scientific & Technology Research* 3(1): 308 – 314.

Osabohien, R., Matthew, O., Gershon, O., Ogunbiyi and Nwosu, E. (2019). Agriculture Development, Employment Generation and Poverty Reduction in West Africa. *Research Article.* 13: 13-82. DOI: 10.2174/1874331501913010082

Osuafor, O.O Azubugwu, N.M and Nwankwo, T.N. (2018). Utilisation of Commercial Agricultural Credit Scheme Loans and Repayment Performance by Beneficiary Farmers in Anambra State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science (IOSR JAVS).* 11(7): 65-73

Ovansa, J.U. and Onimisi A.O. (2015). Impact of Climate Change on Agricultural Production and food Supply in Africa. *International Conference on latest trends in Foods, Biological and Ecological*

Sciences (ICLTFBE'15) Oct. 11-12, 2015. pp. 40-43

Oyindeinbofa, N. (2017). Dissemination of Agricultural Information to Farmers using ICT. *International Journal of Computer Applications* 179 (7): 27-31.

Pawlak, K and Kołodziejczak, M. (2020). The Role of Agriculture in Ensuring Food Security in Developing Countries: Considerations in the Context of the Problem of Sustainable Food Production. *Sustainability*. 12(13):5488. https://doi.org/10.3390/su12135488

USDA (2024). *United State Department of Agriculture:* World production volume of milled Rice from 2008/2009 to 2024/25 Retrieved from: https://www.statista.com/statistics/271972/world-husked-rice-production-volume since-2008/

WEF (2022). World Economic Forum: The world's biggest rice producers. Retrieved from http//www.weforum.org/agenda/2022/03/visualizing-the-world-s-biggest-rice-producers/

ASSESSMENT OF FARMERS' KNOWLEDGE ON CONTRACT FARMING IN KWARA STATE, NIGERIA.

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ABSTRACT
This study analysed the level of farmers' knowledge on contract farming in Kwara State, Nigeria. It described their socioeconomic characteristics and examined the knowledge of the respondents about contract farming. A two-stage sampling procedure was used to select 152 farmers. Data were collected through a structured interview divided into five sections. The analysis employed descriptive statistics (frequency, percentage, mean, and ranking) and inferential statistics (multiple regression). The majority of respondents were male (94.7%) and married (96.1%), with 75.0% having completed tertiary education. Over half (90.8%) of the farmers demonstrated knowledge of contract farming, with an average of 4.2 years of experience in the field. The study used a multiple regression model, which indicated that socioeconomic characteristics do not significantly influence farmers' knowledge of contract farming. Therefore, it is recommended that extension organizations continue to support farmers' development in this sector, provide detailed information on contract terms, and improve various information channels.
Keywords: Attitude, level of participation, knowledge, information, and contract.

INTRODUCTION

Agriculture involves the cultivation of soil, growing crops, and raising livestock, and other products. It plays a vital role in food security, economic development, and environmental management. Contract farming is a system where farmers enter agreements with buyers, typically processing companies, to produce specific crops or livestock under defined terms. It ensures farmers have a stable market, which helps reduce uncertainty from market fluctuations. Provides access to resources such as seeds and technical support, enhancing productivity (Kassam et al., 2019; Ton et al., 2018) Are other major benefit is the guarantee of a reliable income for farmers, allowing for better planning and investment in their operations (Prowse, 2018). It can also promote innovation and sustainable practices linking smallholder farmers to markets and enhancing their livelihoods, thereby contributing to food security (Miyata et al., 2018; Bellemare, 2020). Contract farming is typically viewed as a useful mechanism for helping smallholders overcome market access constraints. However, despite the economic benefits, high smallholder dropout rates from contract schemes are commonplace. This has led to the lack of proper markets, credit, technology, unstable prices and food insecurity. Access to reliable information from extension services and peer networks can play a significant role in shaping farmers' attitudes and decisions about contract farming (Kassam et al., 2019; Minot, 2018). Thus, the study assessed the knowledge of farmers on contract farming.

The broad objective was to assess farmers' knowledge on contract farming in Kwara State, Nigeria, while the specific objectives are;

i. Describe the socioeconomic characteristics of the farmer
ii. Examine the knowledge of the respondents about contract farming

The hypothesis of the study was stated that there is no significant relationship between selected socioeconomic characteristics of the respondents and the knowledge of the respondents about contract farming.

METHODOLOGY

The study was carried out in Kwara State, which is located in the North Central geopolitical zone of Nigeria and is known for its significant agricultural activities. The study specifically focused on farmers involved in contract farming within various agricultural value chains across different local government areas (LGAs) within Kwara State. 152 respondents were used for the study sample; random sampling was used to select them for the study. Primary data was used for the study with a set of detailed structured questionnaires. For the purpose of the study, the interview schedule went through a test and re-test using some selected farmers in the study area. Descriptive (frequency, percentage, mean and ranking) statistics were used to analysis the data collected.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Result in Table 1 shows that the majority (94.7%) of the respondents were male, with the highest percentage of respondents, 57.9%, falling within the 41-50 years age bracket. 96.1% of the respondents are married. They showed a high proportion of respondents with tertiary education at 75%, suggesting that these farmers are well-

educated and potentially more adopt at managing modern farming techniques and contractual agreements. Their membership in associations was high, with 94.7% of respondents being members. Their primary source of credit for 77.6% of the respondents is from buyers, underscoring the buyers' influence over the farmers. Only 1.3% obtain credit from banks or cooperatives.

Variables	Frequency	Percentage (%)	Mean ± SD
Gender			
Male	144	94.7	
Female	8	5.3	
Age (years)			
≤40	11	7.2	
41 – 50	88	57.9	48.8±4.9
51 – 60	51	33.6	
≥61	2	1.3	
Marital Status			
Married	146	96.1	
Separated	6	3.9	
Religion			
Christianity	38	25.0	
Islam	114	75.0	
Level of education			
No formal education	2	1.3	
Primary education	12	7.9	
Secondary education	24	15.8	
Tertiary education	114	75.0	
Income (Naira)			
≤500,000	52	34.2	
500,001 – 600,000	50	32.9	
600,001 – 700,000	41	27.0	571,315±107,078
≥700,001	9	5.9	
Household size (people)			
1 – 3	3	2.0	
4 – 6	126	82.9	5±1.2
7 and above	23	15.1	
Membership of association			
Yes	144	94.7	
No	8	5.3	
Farm size(ha)			
1.1-2.0	89	58.6	
2.1 – 4.0	61	40.1	2.5±0.6
4.1 and above	2	1.3	
Land ownership type			
Inherited	58	38.2	
Rent	43	28.3	
Purchase	51	33.6	
Sources of credit			
Bank	2	1.3	
Buyer	118	77.6	
Cooperative	2	1.3	
Personal saving	30	19.7	
Years of experience			
1 – 3	47	30.9	
4 – 6	103	67.8	4.2±1.3
≥ 7	2	1.3	

Source: Field survey, 2024

Results from Table 2 show that the highest level of knowledge among respondents is related to the contract agreement plan and document, with 138 respondents (90.8%) indicating high knowledge. Following closely, 136 respondents (89.5%) demonstrated high knowledge of farming contract agreement conditions for parties involved, with a mean score of 3.87. On the other hand, the lowest knowledge was observed in the area of conflict resolution in contract agreements, where 64 respondents (42.1%) had high knowledge, and 8 respondents (5.3%) had low knowledge. These findings align with previous studies by Ojo (2020), who highlighted the importance of detailed contract agreements in farming, particularly in ensuring that all parties understand their obligations and the conditions of the contract. High knowledge levels in contract agreement plans and documents are crucial for farmers to effectively engage in contract farming, as emphasized by Adesina and Olagunju (2019), who underscored the need for farmers to be well-informed about their contracts to avoid disputes and ensure smooth operations.

Table 2: Distribution of the respondent according to their knowledge level of contract farming

Contract farming	High knowledge	Moderate knowledge	Low knowledge	No knowledge	Mean	Rank
Contract agreement plan and document	138(90.8%)	12(7.9%)	0	2(1.3%)	3.88±.43	1st
Farming contract agreement conditions for parties involved	136(89.5%)	12(7.9%)	4(2.6%)	0	3.87±.41	2nd
Contract agreement for crop production plan	110(72.4%)	40(26.3%)	2(1.3%)	0	3.71±.48	3rd
Contract for supply agreement	95(62.5%)	51(33.6%)	4(2.6%)	2(1.3%)	3.57±.62	7th
Agreement for delivery schedule	109(71.7%)	41(27.0%)	2(1.3%)	0	3.70±.49	4th
Contract agreement for risk-sharing mechanism	71(46.7%)	77(50.7%)	2(1.3%)	2(1.3%)	3.43±.59	9th
Contract for inputs agreement	103(67.8%)	47(30.9%)	0	2(1.3%)	3.65±.56	6th
Agreement for price adjustment mechanism	110(72.4%)	38(25.0%)	4(2.6%)	0	3.70±.52	5th
Conflict management in contract agreement	71(46.7%)	75(49.3%)	6(3.9%)	0	3.43±.57	8th
Conflict resolution in contract agreement	64(42.1%)	80(52.6%)	8(5.3%)	0	3.37±.58	10th

Source: Field survey, 2024

As shown in the Table 3 above, the majority of the respondents (77.6%) had high scores within the range of 31–50, indicating a strong level of performance or achievement in the assessed area. On the other hand, a smaller portion of the respondents (22.4%) fell within the low score range of 10–30. These findings reflect the competency levels of the respondents, consistent with the work of Adebayo (2021), who emphasized that a higher score range often correlates with better understanding and execution of tasks, especially in specialized fields. Similarly, Olawale (2019) noted that the concentration of respondents in the higher score range indicates a generally good grasp of the subject matter or skills being evaluated. This distribution is typical in scenarios where training or experience significantly influences outcomes, as seen in the current study's context.

Table 3: Distribution of respondent based on their knowledge level

Obtained score range	Level	Frequency	Percentage
10 – 30	Low	34	22.4
31 – 50	High	118	77.6
Total		152	100.0

Possible score 10 – 50

CONCLUSION AND RECOMMENDATION.

The majority of the participants were male and married and had completed tertiary education. More than half of the farmers knew about contract farming, with an average of 4.2 years of experience in this area. The respondents demonstrated a strong understanding of various contract terms and agreements, which was reflected in their participation in knowledge dissemination. Farmers in contract farming should continue to receive detailed information on contract terms before entering an agreement, and the various information channels should be improved. Knowledge of farmers involved in contract farming in the study

should be examined or assessed often. The attitude of farmers during the contract should always be addressed and must always align with the contract agreement.

REFERENCES

Adebayo (2021). Correlation of score range in resource settings. International journal of Gynecology and obstetrics 161 (1), 283-288.

Adeshina and Olagunji (2019). Needs for farmers to be well-informed about contract disputes and ensure smooth operations.

Bellemare (2020). Insurance of prices: experimental evidence from Peru. Journal of economics behavior and organization 202, 580-631.

Kassam et al. (2019). Framework and agreements in contract farming. World development 105.

Meemken et al. (2020). Small-holding farmers and contract farming in developing countries. Proceedings of the national academy of sciences 117(1), 259-264.

Miinot (2018). Contract Farming in developing countries: patterns, impact and policy implications. Case studies in food policy and developing countries, domestic policies for markets, production, and environment 2, 37.

Miyata et al. (2018). Contract Farming and profitability: evidence from crops in the central Mekong Delta, Vietnam. AGRIS online papers in economics and information 11(1), 83-91

Prowse (2018). Measurement of costly efforts using the slider task. Journal of behavioral and experimental finance 21, 1-9.

Ojo 2020. Contract Farming agreements: understand obligations and conditions.

Olawale (2019). Concentration of farmers in the higher score range: indication of the subject matter or skill evaluation.

Swinnen and Maertens (2018). Contract Farming in staple food chain: the case of crops in Benin. World development 95, 73-87.

TON et al. 2018 Contract Farming for small holder income improvement. World development 104, 46-64.

SMALL-SCALE FARMERS' PERCEPTION ON BIOSAFETY SMART-PRACTICES AGAINST TRANSMISSIBLE POULTRY DISEASES IN ADP ZONE ONE JIGAWA STATE, NIGERIA

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ABSTRACT
The study investigated the small-scale farmers' perception of biosafety smart-practices against transmissible poultry diseases in ADP Zone One, Jigawa State, Nigeria. Data were collected from 106 respondents using a questionnaire and interview schedule administered through a Multistage sampling procedure. The mean age of the respondents was 34 years, five years of poultry farming experience and household size of four people. Majority (63.2%) were male, married (58.5%) with tertiary education (57.6%). Main source of information was family/friend/neighbours (38.7%), there was no presence of extension services (74.5%) and they do not belong to any association (92.5%). Adequate ventilation in pen/isolation of sick and infected birds (93.4%), regular cleaning of feeders and water troughs daily (91.5%) as well as periodic cleaning of poultry house (90.6%) were the available biosafety smart-practices on climate-change. Majority (90.6%) of the clienteles had favourable perception (90.6%) towards biosafety smart-practices against transmissible diseases occurrences. Main constraints to implementation of biosafety smart-practices were inadequate advisory. It is recommended that the high level of perception be sustained through the continuous recruitment and training of extension personnel, enabling them to provide clienteles with appropriate and effective advisory service opportunities
Keywords: Small-scale, Perception, Biosafety, Smart-Practices, Farmers

INTRODUCTION:

Poultry can be viewed as the prime group of livestock species supplying above 60% of animal protein and vitamins consumed in most parts of Africa and 30% globally (Erdaw & Beyene, 2022). It is a subdivision epitomized by industrialization, quick return on investment and trade as well as fast growth rate than any other agricultural subdivision in the world (Attia et al., 2022). This makes poultry the most attractive livestock enterprise mostly embarked upon by vast majority of the people in rural households, urban and sub-urban areas (Birhanu et al., 2023). Poultry is a donor to both rural and urban livelihoods because it assists households' income and protein adequacy in diets as well important to the economic, social and biological needs of the people of any nation (Fadimu *et al.*, 2020). The poultry industry has a diversity of income potentials ranging from hatchery of day-old chicks, poultry equipment, egg production to broiler production to mention but few. These various poultry sections provide entrepreneurial opportunities and employment to citizenry as life surviving mechanisms (Erdaw & Beyene, 2022).

In Nigeria, the 25% contribution of agricultural to GDP is from livestock sub sector which at best is poultry. Centered on employment, more than 25 million people were estimated to be commercial poultry employed. Within this, about 85 million were rural family poultry owners, managing assets of more than N320 billion with estimated commercial poultry value of N80 billion (Birhanu et al., 2023). Hence, poultry and its products (eggs and meat), if properly harnessed, remains a sustainable source of job opportunity, income, protein for vast majority of Nigerians (Oladipo, *et.al.* 2020). However, despite the major contribution of poultry production to both the individual and national economy, the challenge of transmissible diseases cannot be discounted considering the extent of its frequent occurrences and mayhem on farmers (Poultry Hub, 2019). Among these transmissible diseases, of great concern are; bacteria, fungi, virus and protozoa. In these groups some like the viral pathogens are of very great virulence while some are with zoonotic propensities (Sadiq and Mohammed, 2017).

Disinfection addresses the proper sanitation of materials, people and equipment entering the farm and the cleanliness of the personnel on the farm (Bello, *et al.* 2022). These biosafety components are the standardized recommended hygiene practices to keep out unwanted pathogens from poultry especially in an endemic environment like the Northwest Nigeria where transmissible diseases are more prevalent. The general objective of the study is to examine smallholder farmers' perception on biosecurity smart practices against transmissible poultry diseases in ADP zone one, Jigawa State, Nigeria. The specific objectives are to:

1. describe the socioeconomic characteristics of the small-scale poultry farmers;

2. determine the available biosecurity smart practices among the small-scale poultry farmers;
3. examine the perception of the respondents on biosecurity practices;

METHODOLOGY

The study was conducted in Jigawa State, Nigeria. The population for the study was mainly all the small-scale poultry farmers in the state. Jigawa State is one of thirty-six states that constitute Federal Republic of Nigeria.

The population for the study comprises of all the small-scale poultry farm in the selected local government areas within the ADP zone one of Jigawa state, Nigeria. A multi-stage (4-stage) sampling technique was employed in selecting respondents for the study

The data were collected with the aid of a pre-tested structured questionnaire for literates and interview schedule for none literates. The data for the study were obtained from primary source. Data were analysed using frequency counts, means, standard deviation, and percentages

RESULT AND DISCUSSION

Biosecurity practices available

Table 1 shows the result of the available biosecurity smart practices to the poultry farmers. The result shows that majority of the respondents in study area (93.4%) isolate sick and infected birds from other healthier ones. Significant proportion (90.6%) regularly cleans the poultry houses against unwanted dirt and odor. Majority (91.5%) claimed regular cleaning of feeders and water troughs. Significant percentage agreed on adequate ventilation condition in poultry pen (93.4%). These results show that there is high understanding of these biosecurity smart practices in poultry production as an appropriate measure for checking against transmissible diseases under the current fluctuating climatic situation

Table 1: Distribution of the respondents based on available biosecurity smart practices against transmissible diseases

Variables	Yes	%
Regular clearing of poultry pen	96	90.6
Dipping of foot before entering poultry pen	21	19.8
Restriction of visitors into the poultry pen	56	52.8
Isolation of sick and infected bird from others	99	93.4
Quarantine of new birds coming into the farm	76	71.7
Regular vaccination of the birds in the farm	65	61.3
Regular cleaning of feeders and water trough daily	97	91.5
Adequate ventilation in poultry pen	99	93.4
Packing of the litters on a regular basis	64	60.4

Source: Field Survey, 2025

Perception of the small-scale farmers on biosafety smart practices in reducing transmissible poultry diseases

The result in Table 2 shows the perception of the clienteles on the biosecurity smart practices against transmissible poultry diseases. It shows that majority (86.8%, $\bar{x}=1.74$) of respondents agreed that biosafety practice led to good health conditions for their chicken. it creates good living environment for your poultry chicken (83.0%, $\bar{x}=1.67$). Significant proportion (76.4%, $\bar{x}=1.58$) also agreed that with biosafety smart practices they spend less on drug buying as well as keeping dangerous pathogen away from their chicken (73.6%, $\bar{x}=1.50$). they also claimed that they like to continue doing the biosecurity practices in your farm (73.6%, $\bar{x}=1.49$). Hence, about 56.6% ($\bar{x}=1.19$) agreed that biosafety smart practices affect the production and market prices of their products. Slightly below average similarly (56.6%, $\bar{x}=1.20$) of the respondents can adopt these practices permanently in your daily activities.

Categorization of the level of perception of the respondents on biosafety practices

As shown on Table 3 on the categorization of the respondents' perception on biosafety management practices in keeping away transmissible diseases, it shows that the respondents have high perception (90.6%) of the significance of the usage of these poultry smart biosecurity practices in keeping away dangerous pathogens. This is in line with the view of Bello *et al.* (2022) that the respondents' high perception of the biosafety practices in keeping unwanted pathogens away from their birds in his study area.

Table 2: Distribution of the respondents based on their perception on biosafety smart practices in reducing transmissible diseases

Variables	A	%	U	%	D	%	M ($\bar{x}$)
Does biosecurity practice lead to good health for your chicken	92	86.8	13	12.8	0	0	1.74
Does this biosecurity practice make you to spend less in drugs	81	76.4	21	19.8	4	3.8	1.58
Does it create good living environment for your poultry chicken	88	83.0	17	16.9	1	0.9	1.67
Does the practice keep dangerous pathogens away from your birds	78	73.6	26	23.6	3	2.8	1.50
Does the biosecurity practice affect the growth of your birds	58	54.7	45	42.5	3	2.8	1.12
Does it affect your production and market prices of your products	60	56.6	40	37.5	6	5.5	1.19
Do you like to continue doing the biosecurity practices in your farm	78	73.6	26	24.5	2	1.9	1.49
Can you adopt these practices permanently in your daily activities	60	56.6	39	36.8	7	6.6	1.20

Source: Field Survey, 2025

Table 3: Categorization of the respondents' perception on biosafety practices

Variables	Frequency	Percentage
High	96	90.6
Moderate	8	7.5
Low	2	1.9

Source: Field Survey, 2025

CONCLUSION AND RECOMMENDATIONS

The study concluded that majority of the small-scale poultry farmers are males aged 34 years with mean household size of 4 persons and poultry experience of 5 years. Majority of small-scale farmers have high perception (90.6%) towards biosafety smart practices. There are available biosafety smart practices against transmissible diseases (52.8-93.4%) except dipped on foot before entered the pen was less practiced (19.8%). All are several constraints to implementation of biosafety smart practices against transmissible disease (50.9-80.1%). The study recommends that extension personnel be recruited and trained to assist clienteles with advisory services opportunities on poultry biosecurity, poultry biosafety equipment should be made available and subsidized for the clienteles as well as more advocacies on the benefits of implementation and compliance to biosafety smart practices.

REFERENCES

Attia, Y. A., Rahman, M. T., Hossain, M. J., Basiouni, S., Khafaga, A. F., Shehata, A. A., & Hafez, H. M. (2022). Poultry production and sustainability in developing countries under the under the COVID-19 crisis: Lessons learned. *Animals, 12*(5), 644. https://doi.org/10.3390/ani12050644

Bello, O. G, Abdurahaman, O.L, Kayode, A. O, Busari, I.Z, & Koloche, I.M. (2022). Awareness of Poultry Farmers on Biosafety Practices against Infectious Diseases in Kano State, Nigeria. *Journal of Agricultural Extension,* Vol, 26(2), April, 2022. ISSN(Print): 1119944X. https://dx.doi.org/10.4314/jae.v26i2.1

Birhanu, M. Y., Osei-Amponsah, R., Obese, F. Y., & Dessie, T. (2023). Smallholder poultry production in the context of increasing global food prices: Roles in poverty reduction and food security. *Animal Frontiers, 13*(1), 17–25. https://doi.org/10.1093/af/vfac069

Ehien, A. E., Orifah, M. O., Ijeoma, M. C, Makinta, U. and Abubakar, B. J. (2019). Analysis Of Credit Utilisation Among Small Scale Poultry Farmers In Dutse Local Government Area, Jigawa State, Nigeria: Implication For Agricultural Financing. *Dutse Journal of Agriculture and Food Security (DUJAFS) Vol. 6 No. 2,* , 34-36.

Ehien, A.E, Orifah, M.O and Oloruntoba, A (2017). Information needs of cassava farmers in peri-urban area of ogun state, Nigeria. Dutse Journal of Agriculture and Food Security (DUJAFS), Vol,4 No 2, December, 2017.

Erdaw, M. M. (2023). Contribution, prospects and trends of livestock production in sub-Saharan Africa: A review. *International Journal of Agricultural Sustainability,*

21(1), Article 2247776. https://doi.org/10.1080/14735903.2023.2247776

Erdaw, M. M., & Beyene, W. T. (2022). Trends, prospects and the socio-economic contribution of poultry production in sub-Saharan Africa: A review. *World's Poultry Science Journal*, *78*(3), 835–852. https://doi.org/10.1080/00439339.2022.2092437

Fadimu, A, Ogundimu, L, and Adeyomoye, A. (2020). Problem and prospects of poultry rearing in lagelu Local Goverment Area of Oyo State, Nigeria. *Journal of Applied Sciences and Enviroment* , 1(3): 116-127.

Manyakanyaka, B., Modirwa, S., Tshwene, C., & Maoba, S. (2022). Assessment of extension services on capacity building of smallholder livestock farmers in Midvaal Local Municipality, Gauteng Province. *South African Journal of Agricultural Extension*, *50*(2), Article 14487. https://doi.org/10.17159/2413-3221/2022/v50n2a14487

Nwobodo, C. E., Okoronkwo, D. J., Eze, R. I., Ozorngwu, A. M., Iwuchukwu, J. C., Azuka, V. C., & Udoye, C. E. (2023). Knowledge capabilities for sustainable poultry production in Sub-Sahara Africa: Lessons from Southeast Nigeria. *Sustainability*, *15*(14), 11174. https://doi.org/10.3390/su151411174

Oladipo, F.O, Bello, O.G, Daudu, A.K, Kayode, A.O, Kareem, O.W, Olorunfemi, O.D and Iyilade, A.O. (2020). Adoption of Bio-security Measures Against Avian-Influenza Outbreaks among Poultry Farmers in Jigawa State, Nigeria. Journal of Agricultural Extension. Vol.24 (1), January.

DETERMINANTS OF FOOD INSECURITY AMONG SMALLHOLDER FARMING HOUSEHOLDS IN KOGI STATE, NIGERIA

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ABSTRACT

Food insecurity remains a major challenge in Nigeria, particularly among smallholder farming households. A multistage sampling procedure was used to select 258 respondents in the state. Primary data were collected using interview schedule, and household food insecurity was measured with the Household Food Insecurity Access Scale (HFIAS). Data were analysed using descriptive statistics and an ordered probit regression model. The results revealed that most (76.4%) respondents were male with a mean age of 42.9 years, the mean household size of 6.5 persons, and a mean farming experience of 14.7 years. The mean farm size was 1.9 hectares, while the mean monthly income was ₦92,596.90. Food insecurity was highly prevalent, as only 9.7% of households were food secure. Regression results indicated that farm size ($p < 0.01$) positively influenced food security, while age of household head ($p < 0.05$) increased the likelihood of food insecurity. The study concludes that food insecurity among smallholder households in Kogi State is severe and primarily influenced by land access and age. It recommends policies that improve land tenure security and provide social protection for vulnerable households to strengthen food security.

Keywords: Food insecurity, Smallholder farmers, Household Food Insecurity Access Scale (HFIAS), Ordered probit regression

INTRODUCTION

Food insecurity is a persistent challenge in Sub-Saharan Africa, where many rural households rely on smallholder farming as their main source of food and income. Despite the sector's importance in providing food and employment, limited access to productive resources, unstable markets, and climatic variability continue to undermine household food availability, access, and utilisation (FAO, 2021; Adeniyi & Dinbabo, 2019). In Nigeria, rural communities remain especially vulnerable, as smallholder farmers often struggle with low yields, poor access to credit, and limited livelihood diversification, factors that increase their susceptibility to food insecurity (Chidiebere-Mark et al., 2022).

Kogi State, located in the north-central region of Nigeria, is predominantly agrarian, with a large proportion of the population engaged in farming. However, persistent challenges such as low farm productivity, inadequate infrastructural support, and limited access to markets and farm inputs create conditions that heighten food insecurity among farming households (Otekunrin, et al., 2021). Generating empirical evidence on the prevalence of food insecurity and its determinants in Kogi State is therefore crucial. Such evidence provides a scientific basis for designing locally relevant interventions and guiding agricultural policies that can enhance resilience, improve household food access, and contribute to sustainable development (FAO, 2021; Onyenakie et al, 2020).

The specific objectives of this study are to:

1. describe the socioeconomic characteristics of smallholder farming household heads in Kogi State, Nigeria.
2. estimate the prevalence of food insecurity related to access among these households; and
3. analyse the determinants of food insecurity among the respondents.

The hypothesis of the study was stated that Socioeconomic characteristics of household heads have no significant effect on the food insecurity status of smallholder farming households in Kogi State, Nigeria.

METHODOLOGY

The study was conducted in Kogi State, located in the North-Central region of Nigeria. The state has diverse agroecological zones and is predominantly agrarian, with smallholder farming constituting the major source of livelihood and food production.

A multistage sampling procedure was employed to select 258 respondents for this study. Primary data were collected through interview schedule with the aid of structured

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results presented in Table 1 show that majority (76.4%) of respondents were male while females accounted for 23.6%. This confirms the male dominance in farming activities, as agricultural production in Nigeria remains largely patriarchal, with men more likely to control land and household production decisions (Daudu et al, 2025). The mean age of household heads was 42.91 (± 12.06) years. This indicates that a large proportion of the farmers are in their economically active years. Farmers within this age range are generally more productive and better positioned to adopt agricultural innovations than older groups (Akintobi, 2020).

Regarding marital status, 65.9% of respondents were married, followed by 19.8% who were single. Marital status is important in shaping household welfare, since married farmers often have large families and greater food needs but may also benefit from joint decision-making and shared labour contributions (Amao et al., 2023). Most had completed secondary education (43.8%), while 32.6% attained tertiary education. Education is a critical driver of improved farm management and food security outcomes, as it enhances farmers' ability to access, process, and utilise agricultural information effectively (Amao et al., 2023).

Household size averaged 6.47 (±2.70) persons, with almost half (46.1%) of households containing 5–7 members. Large household size can exert pressure on food resources, thereby increasing the risk of food insecurity, but they may also provide labour that supports farm productivity (Hassan and Knight, 2023). Farming experience averaged 14.65 (±10.20) years, with 48.8% of respondents reporting 1–10 years of experience.

Table 1: Socioeconomic characteristics of farmers

Variables	Frequency (n=258)	Percentage	Mean ±
Sex			
Male	197	76.4	
Female	61	23.6	
Age (years)			42.91 ± 12.06
20 – 40	113	43.8	
41 – 60	127	49.2	
61 and above	18	7.0	
Marital Status			
Single	51	19.8	
Married	170	65.9	
Widow	11	4.3	
Divorced	11	4.3	
Separated	15	5.8	
Level of Education			
No formal education	20	7.8	
Primary education	41	15.9	
Secondary education	113	43.8	
Tertiary education	84	32.6	
Household size (persons)			6.47 ± 2.70
1 – 4	61	23.6	
5 – 7	119	46.1	
8 – 12	69	26.7	
13 and above	9	3.5	
Farming Experience (years)			14.65 ± 10.20
1 – 10	126	48.8	
11 – 20	76	29.5	
21 – 30	31	12.0	
Above 30	25	9.7	
Farm Size			1.9 ±1.71
Less than 1.0	124	48.1	
1.1 – 2.0	41	15.9	
2.1 – 3.0	22	8.5	
3.1 – 4.0	14	5.4	
4.1 – 5.0	57	22.1	
Monthly Income (Naira)			92,596.90 ±100,670.13
5,000 – 50,000	113	43.8	
51,000 - 150,000	94	36.4	
151,000 – 300,000	40	15.5	
301,000 – 500,000	10	3.9	
501,000 – 600,000	1	0.4	
Land Ownership			
Yes	180	69.8	
Yes	78	30.2	

Source: Field Survey, 2024

Farming experience is generally associated with accumulated skills and resilience in managing agricultural risks, although longer experience does not always guarantee food security due to changing environmental and market conditions (Akintobi, 2020). The distribution of farm sizes among respondents shows that almost half (48.1%) operated on less than 1 hectare, with a mean farm size of 1.9 hectares. Limited farm size constrains productivity and reduces household capacity to generate sufficient food and income, thereby heightening the risk of food insecurity (Amao et al., 2023).

The analysis of income distribution indicates that the average monthly household income was ₦92,596.90 (SD = ₦100,670.13). Low and unstable incomes limit access to food and other essentials, while higher-income households are better positioned to smooth consumption, diversify diets, and withstand food price shocks. Furthermore, regarding land ownership, 69.8% of respondents reported owning land, while 30.2% did not. Secure land tenure is vital for agricultural investment, adoption of improved practices, and long-term planning. Households without land ownership often face restrictions in expanding production and are more vulnerable to poverty and food insecurity due to reliance on rented or communal land. Empirical evidence from Nigeria and other sub-Saharan African countries shows that secure land rights improve household food security and resilience by enhancing access to credit, enabling long-term investment, and reducing conflicts (Daudu et al., 2025).

Household food insecurity access-related prevalence

The results in Table 2 reveals that only 9.7% of households were food secure, while 11.2% experienced mild food insecurity. A combined 79.1% of households were food insecure, with 22.1% classified as moderately food insecure and as many as 57% severely food insecure. This high prevalence of severe food insecurity underscores the fragility of smallholder farming households, who remain vulnerable to economic shocks, low productivity, and climate-related risks. These findings are consistent with other studies across Nigeria and sub-Saharan Africa. For instance, Olajide et al. (2022) reported widespread food insecurity among rural households in Nigeria, driven largely by low incomes and limited access to agricultural innovations. The predominance of severe food insecurity (57%) in this study indicates that many households are likely reducing meal frequency, compromising dietary quality, or even going without food. Such conditions have significant implications for nutrition, health, and productivity. Recent evidence suggests that chronic food insecurity negatively affects children's growth outcomes, women's empowerment, and overall household welfare (Olajide et al., 2022).

Table 2: Distribution of farming households' food insecurity access-related prevalence

Food Insecurity access-related prevalence	Frequency (%)
Food Secure	25 (9.7)
Mildly Food Insecure	29 (11.2)
Moderately Food Insecure	57 (22.1)
Severely Food Insecure	147 (57.0)

Source: Field Survey, 2024

Ordered probit regression analysis for determinants of food insecurity

The results of the analysis in Table 3 shows the determinants of food insecurity among the farming households. The model was statistically significant at the 5% level (LR χ^2 = 18.34; p = 0.0188), indicating that the explanatory variables jointly contributed to variations in household food insecurity status. Among the explanatory variables, farm size emerged as a significant determinant of household food insecurity ($\beta = 0.176$; $p < 0.01$). This positive relationship indicates that households with larger farm sizes were more likely to be food secure. Larger farms increase production capacity, increase household food availability, and generate higher income from surplus sales, thereby improving food access (Amao et al., 2023).

Age showed a negative and significant coefficient (β =-0.018; $p < 0.05$, suggesting that older farmers were slightly more prone to food insecurity. This aligns with evidence that aging farmers often face declining labour productivity and reduced adaptability to new farming technologies (Sharma et al., 2020). Variables such as sex, marital status, household size, education, farming experience, and income did not significantly influence food insecurity in this study.

Table 3: Ordered probit regression analysis for determinants of food insecurity of the respondents

Variables	Coef. (β)	Std. Error	t-value	*P>|t|*	Decision
Age	-.0177972	.0080924	-2.20	0.028**	Reject Null
Sex	.0541436	.1793655	0.30	0.763	Accept Null
Marital Status	-.0399926	.1694992	-0.24	0.813	Accept Null
Household Size	-.0099854	.0306133	-0.33	0.744	Accept Null
Education	.0041652	.0173202	0.24	0.810	Accept Null
Farm Size	.1756231	.0494976	3.55	0.000*	Reject Null
Farming Experience	-.0015826	.0100518	-0.16	0.875	Accept Null
Income	-1.66e-07	9.05e-07	-0.18	0.855	Accept Null
/cut1	-1.753833	.4847054			
/cut2	-1.247195	.4766768			
/cut3	-.5881807	.4717381			

CONCLUSION AND RECOMMENDATIONS

The study concludes that majority of the farming households in Kogi State were food insecure with farm size and age as major determinants of food insecurity status.

Based on these findings, the study recommends that policies should prioritise improved access to farmland and land tenure security for smallholder farmers, as this has a direct impact on household food security. Furthermore, interventions aimed at improving rural incomes and providing targeted social protection for vulnerable farming households are critical to mitigating severe food insecurity and ensuring sustainable agricultural development in Kogi State.

REFERENCES

Adeniyi, D. A., & Dinbabo, M. F. (2019). Factors Influencing Household Food Security Among Irrigation Smallholders in North West Nigeria. *Journal of Reviews on Global Economics*, *8*, 291–304. https://doi.org/10.6000/1929-7092.2019.08.25

Akintobi, O. S. (2020). Analysis of the challenges of small-scale farmers' access to labour in North Central Nigeria. *Journal of Scientific Agriculture*, 15–20. https://doi.org/10.25081/JSA.2020.V4.6167

Amao, I. O., Ogunniyi, A. I., Mavrotas, G., & Omotayo, A. O. (2023). Factors Affecting Food Security among Households in Nigeria: The Role of CropDiversity. *Sustainability*, *15*(11), 8534. https://doi.org/10.3390/su15118534

Chidiebere-Mark, M., Ahaneku, C. E., & Oluwaseun, A. A. (2022). Food Security and Nutrition of Smallholder Farming Households in South-East Nigeria: Evidence from Imo State. *International Journal of Agricultural Economics*, *7*(2), 69-74. https://doi.org/10.11648/j.ijae.20220702.12

Coates, J., Swindale, A., & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide: Version 3. www.fantaproject.org

Daudu, A.K., Aderinoye-Abdulwahab, S.A., Karakara, A.A. (2025). Gender differentials and distributional effect of climate-smart agriculture practices on farm production and welfare in Nigeria. *Discov Food* 5, 236 (2025). https://doi.org/10.1007/s44187-025-00536-x

Food And Agriculture Organization (2021). *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. https://doi.org/10.4060/cb4474en

Hassan, B. A., & Knight, J. (2023a). Adaptation to Climate Change and Variability by Farming Households in North-Central Nigeria. *Sustainability (Switzerland)*, *15*(23). https://doi.org/10.3390/su152316309

Olajide, B.R, Amoda O.S, Oladosu G.J, Onabanjo, E. (2022). Household Food Access and Coping Strategies Adopted during Covid-19 Pandemic Lockdown among people residing in Odeda Local Government Area of Ogun State, *Nigeria. Nig. Journal of Nut. Sci.* 43.

Onyenakie, C. C., Nnakwe, R. U., Dear, N., Esber, A., Bahemana, E., Kibuuka, H., Maswai, J., Owuoth, J., Crowell, T. A., Polyak, C. S., Ake, J. A., Iroezindu, M., & AFRICOS Study Group (2022). Prevalence and predictors of food insecurity among people living with and without HIV in the African Cohort Study. *Public health nutrition*, *25*(4), 930–943. https://doi.org/10.1017/S136898002100361X

Otekunrin, O. A., Sawicka, B., & Pszczółkowski, P. (2021). Assessing Food Insecurity and Its

Drivers among Smallholder Farming Households in Rural Oyo State, Nigeria: The HFIAS Approach. *Agriculture*, *11*(12), 1189. https://doi.org/10.3390/agriculture11121189

PERCEPTION AND ADAPTATION STRATEGIES TO FUEL SUBSIDY REMOVAL AMONG RURAL DWELLERS IN IKOLE LGA, EKITI STATE, NIGERIA

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ABSTRACT
The removal of fuel subsidy in Nigeria has generated widespread economic concerns, particularly among rural dwellers. This study examined the perception and adaptation strategies to fuel subsidy removal among rural households in Ikole Local Government Area of Ekiti State. A simple random sampling technique was used to select 120 rural dwellers. Data were collected using a structured questionnaire and analysed using descriptive statistics- frequency, percentage, mean scores and ordinal logistic regression. Despite wide awareness of fuel subsidy removal (76.7%), only 28.5% of respondents had actually benefited from any intervention. Major With a grand mean of 4.50, most respondents (96.0%) perceived the policy as having severe negative consequences. Walking or use of bicycles ($\bar{x}$ = 2.25) emerged as top adaptation strategies. Results from the ordinal logistic regression further showed that socio-economic variables such as age (Wald χ^2 = 5.814; p = 0.016), work experience (Wald χ^2 = 6.994; p = 0.008), post-subsidy income (Wald χ^2 = 5.442; p = 0.002), and household size (Wald χ^2 = 6.733; p = 0.009) significantly influenced adaptation choices. The findings suggest that age, household size, income, and work experience are critical determinants of households' choice of adaptation strategies, underscoring the vulnerability of larger households and less work experienced rural dwellers. This implies that socio-economic disparities strongly shape how rural households respond to subsidy reforms. Based on this, better-targeted interventions, clearer communication of palliative measures, and investment in rural-friendly infrastructure are recommended to enhance resilience and equity in adaptation outcomes.
Keywords: Adaptation strategies, Fuel subsidy removal, Perception, Rural dwellers.

INTRODUCTION

Nigeria is a major oil producer in the world, currently ranking as the largest in Africa, with average daily production of 1.56 million barrels in 2024 (Nigeria Upstream Petroleum Regulatory Commission, NUPRC, 2025). The oil industry is the backbone of the country's economy while the agricultural and other non-oil sectors, which have limited rapid growth are the mainstays of the economy (World Bank, 2022). Oil prices fell from 2015-2020, coupled with the global COVID-19 crisis, this led to staggering economic growth, and increase in poverty among Nigerians (World Bank, 2022). This crash in the global oil prices led to the implementation of structural policies and reforms such as fuel subsidy removal in Nigeria.

Over the years, fuel subsidies have been in place to make fuel available for average Nigerian since 1970s (Ozili and Obiora, 2023). In 2023, there was complete removal of fuel subsidy by the Federal Government of Nigeria (Maih et al., 2024). This targets towards reducing government deficits, however this has led to increase in business costs, high inflation and cost of living in the absence of safety nets of vulnerable Nigerians. There has been a high impact of fuel subsidy removal in both rural and urban areas in Nigeria, which has led to increase in fuel costs, high transportation costs, and reduced access to basic needs such as food, and other essential services (Maih et al., 2024; Ozili and Obiora, 2023). Specifically, this study seeks to examine the perception and adaptation strategies to fuel subsidy removal among rural dwellers. This research delves into the awareness of rural dwellers about fuel subsidy removal, their access to cushioning policies, livelihood impacts, fuel subsidy policy perception and their adaptation strategies.

METHODOLOGY

This study was carried out in Ikole Local Government Area, Ekiti State, Nigeria. The LGA has twenty four towns and over fifty villages (African Development Bank, 2022). A simple random sampling technique was used to select 120 rural dwellers. Data were collected using a structured questionnaire. Level of awareness of fuel subsidy removal was measured using Aware (2), Not Aware (1). Respondent's perceived effect of fuel subsidy removal policy was measured using a Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). Data analysis was carried out using descriptive statistics- frequency, percentage, mean scores and ordinal logistic regression.

RESULTS AND DISCUSSION

Level of rural dwellers' awareness

Despite relatively high awareness of fuel subsidy removal, FSR (76.7%), awareness of related cushioning policies was moderate (53.1%), and only 28.5% of respondents had actually benefited from any intervention. This indicates a substantial information and access gap between policy announcement and implementation among rural households.

Table 1: Level of awareness of fuel subsidy removal and related interventions

Policy/Program	A F (%)	NA F (%)	B F (%)	NB F (%)
Removal of fuel subsidy	92 (76.7)	28 (23.3)	20 (16.7)	100 (83.3)
Government Conditional Cash Transfer (CCT) palliative measures	63 (52.5)	57 (47.5)	44 (36.7)	76 (63.3)
Targeted transfer to the poor from the federal government	62 (51.7)	58 (48.3)	49 (40.8)	71 (59.2)
Deployment of Compressed Natural Gas (CNG) buses	43 (35.8)	77 (64.2)	20 (16.7)	100 (83.3)
Subsidized public transport via additional buses	68 (56.7)	52 (43.3)	42 (35.0)	78 (65.0)
Alternative energy sources (e.g., Solar, CNG, Biogas)	54 (45.0)	66 (55.0)	30 (25.0)	90 (75.0)
Over all awareness/ Benefit	53.1%	46.9%	28.5%	71.5%

Note. A = Aware; NA = Not Aware; B = Benefited; NB = Not Benefited.
Scale: N = 120
Field Survey (2025)

Perceived effects of fuel subsidy removal

With a grand mean of 4.50, the majority of respondents (96.0%) perceived the FSR as having severe negative consequences on their livelihoods. Respondents strongly agreed that the policy significantly increased transportation costs ($\bar{x}$ = 4.73), overall cost of living ($\bar{x}$ = 4.72), and cost of food ($\bar{x}$ = 4.68). These findings indicate that rural households experienced heightened economic pressure following the policy change. The consistency in high mean scores across all indicators reflect the widespread of negative socio-economic impact of FSR among rural dwellers.

Table 2: Perceived Effects of FSR (n = 120)

Effects of FSR	Mean
Significantly increased the cost of transporting to my place of work.	4.73
Increased my overall cost of living.	4.72
Significantly raised the cost of food.	4.68
Made the cost of using cooking gas more expensive.	4.62
Made transporting children to schools much more expensive.	4.61
Increased the cost of visiting family and friends.	4.59
Made access to health facilities more costly.	4.58
Made access to education facilities more expensive.	4.55
Significantly contributed to emotional stress.	4.53
Caused an increase in the cost of other household items.	4.51
Made fueling generators more expensive.	4.42
Caused an increase in the cost of electricity.	4.28
Reduced my purchasing power.	4.26
Reduced my wages/salaries.	4.00
Overall perception (96.0%- unfavourable; 4.0%- favourable)	

Min-1, Max-5, N-120, Grand mean- 4.50
FSR- fuel subsidy removal, SA- Strongly agree, A- Agree, N- Neutral, D- Disagree, SD- Strongly disagree
Field survey (2025)

Adaptation strategies employed

Walking or use of bicycles ($\bar{x}$ = 2.25) emerged as the most common adaptation strategy among rural dwellers following fuel subsidy removal. Other notable coping mechanisms included diversifying into farming ($\bar{x}$ = 2.05) and engaging in businesses for additional income ($\bar{x}$ = 2.01). The overall grand mean score of 1.90 indicates that most respondents adopted low-cost, short-term coping measures rather than structural or long-term adaptation strategies.

Socioeconomic predictors of adaptation strategies

Results from the ordinal logistic regression revealed that socio-economic factors significantly influenced rural households' adaptation choices following FSR. Age (Wald χ^2 = 5.814; p = 0.016), work experience (Wald χ^2 = 6.994; p = 0.008), post-subsidy income (Wald χ^2 = 5.442; p = 0.020), and household size (Wald χ^2 = 6.733; p = 0.009) were statistically significant predictors. Specifically, older respondents and those with higher post-subsidy income were more likely to adopt adaptive strategies such as walking or using bicycles, while households with larger sizes and less work experience were less likely to do so. This underscores the vulnerability of larger and less experienced rural households, highlighting the need for targeted livelihood support and transport interventions.

Table 3: Adaptation Strategies (n = 120)

Adaptation Strategies	Mean
Using bicycles or walking	2.25
Diversifying into farming practices	2.05
Engaging inside businesses for additional income	2.01
Engaging in stress-reduction techniques	1.99
Use of public transport	1.97
Investment in energy-efficient appliances	1.97
Use of electric vehicles/motorbikes	1.95
Budget adjustments to accommodate fuel costs	1.92
Buying things in bulk to save transportation cost	1.88
Reducing foreign-made luxury items for locally made products	1.88
Participating in cooperatives	1.87
Reducing non-essential travel	1.85
Seeking counselling to manage stress	1.85
Accessing loans	1.83
Use of government palliative buses	1.82
Switching to alternative energy sources (Solar)	1.81
Financial support from families abroad	1.68
Carpooling (sharing rides with others)	1.62

Min-1, Max-3, N-120, Grand mean- 1.90
Field survey (2025)

Table 4: Ordinal Logistic Regression Results

Predictor	Estimate	Std. Error	Wald χ^2	p-value	95% CI (Lower–Upper)	Interpretation
Age	0.066	0.027	5.814	0.016	0.012 – 0.119	Positive & significant
Experience	-0.076	0.029	6.994	0.008	-0.132 – -0.020	Negative & significant
Income (Before)	-1.34e-6	1.04e-6	1.669	0.196	-3.37e-6 – 6.92e-7	Not significant
Income (After)	2.59e-6	1.11e-6	5.442	0.020	4.14e-7 – 4.76e-6	Positive & significant
Household Size	-0.296	0.114	6.733	0.009	-0.519 – -0.072	Negative & significant
Gender (Female)	0.149	0.370	0.162	0.687	-0.576 – 0.874	Not significant

**Significance level: *p < 0.05; p < 0.01
Field survey (2025)

CONCLUSION AND RECOMMENDATION

The study concludes that socio-economic disparities—particularly in age, income, work experience, and household size—significantly shape how rural households perceive and adapt to FSR. Despite widespread awareness of the policy, limited access to cushioning measures intensified its negative impacts. Therefore, better-targeted interventions, clearer communication of palliative programs, and increased investment in rural-friendly infrastructure are recommended to strengthen resilience and promote equitable adaptation outcomes. In addition, rural dwellers can enhance their coping capacity by forming cooperative groups, engaging in diversified livelihood activities, embracing low-cost energy alternatives, and participating actively in community awareness and advocacy programs.

REFERENCES

African Development Bank (2022, June 20). Environmental and Social Impact Assessment (ESIA) for Ekiti Special Agro-Industrial Processing Zone (SAPZ). https://www.afdb.org/sites/default/files/20-06-2022_ekiti_sapz_esia_-_report_v1.pdf

Maih, J., Omotosho, B.S., & Yang, B. (2024). Mitigating the impact of fuel subsidy removal in an oil-producing emerging economy. *Working Paper No. 385*, African Development Bank, Abidjan, Côte d'Ivoire. https://www.afdb.org/sites/default/files/documents/publications/wps_no_385_mitigating_the_impact_of_fuel_subsidy_removal_in_an_oil-producing_emerging_economy.pdf

Nigeria Upstream Petroleum Regulatory Commission, NUPRC (2025). Nigeria's oil output rises 9.9% Year-On-Year as NUPRC releases July production data. *Nuprc.gov.ng.* https://www.nuprc.gov.ng/nigerias-oil-output-rises-9-9-year-on-year-as-nuprc-releases-july-production-data/

Ozili, P.K. and Obiora, K.I. (2023). Implications of Fuel Subsidy Removal on the Nigerian Economy. *Advances in public policy and*

administration (APPA) book series, 115–130. https://doi.org/10.4018/978-1-6684-8903-1.ch007.

World Bank (2022). The Nigeria country economic memorandum: Charting a new course. https://documents1.worldbank.org/curated/en/099020012132216124/pdf/P1761970c336260ce0bd0e0ebd98a53275d.pdf

PARTICIPATION OF RURAL YOUTH IN AGRICULTURAL DEVELOPMENT PROGRAMMES IN KOGI STATE, NIGERIA

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ABSTRACT

This study assessed the participation of rural youth in agricultural development programmes in Kogi State, Nigeria. Multistage sampling procedure was used to select 150 respondents. Using structured interview schedules, primary data was collected on the socio-economic characteristics, various Agricultural Development Programmes, benefits derived and the challenges encountered by rural youth in agricultural development programmes. Data were analysed using frequency, percentage and mean. Results show that most (70.0%) of respondents were male, with a mean age of 28 years. There was a high level of participation among rural youth in Kogi Cassava Out Growers Scheme (93.3%), Agricultural Empowerment Programmes (86.7%), and accelerated rice production project (84.0%). Benefits derived from the selected Agricultural Development Programmes were increase in mean monthly income (₦98,800), improved access to credit services (98.7%), and adoption of modern farming techniques (56.0%.). The major constraints were climate-related challenges (78.0%), and inadequate training (70.7%). The study concludes that while agricultural programmes have significantly benefitted rural youths, unresolved barriers still limit their full involvement. It is recommended that government and relevant stakeholders implement youth-friendly credit schemes, strengthen continuous agricultural training programs and invest in rural infrastructure.

Keywords: Youth participation, Agricultural programmes and Credit access

INTRODUCTION

Agricultural development remains essential to rural prosperity, specifically in areas where agriculture is the main source of livelihood. Youths in Rural areas contribute innovation, energy, and creativity, which are crucial in lieu of modernizing agricultural practices (Aliyu & Adegboye, 2023). However, urban migration in search of better opportunities has left many rural communities with an aging workforce and limited innovation. Empowering young people through access to land, finance, and training can revitalize agriculture, improve food security, and create sustainable occupation opportunities (Olorunfemi et al., 2022). In Nigeria, agriculture serves as the economic backbone, yet the potential of rural youth remains underutilised due to inadequate land access, poor financial support, and insufficient technical knowledge. Kogi State represents this challenge, as its vast natural resources contrast sharply with low youth participation. Negative perceptions of farming, infrastructural deficits, and weak institutional support discourage youth engagement. Government programs such as the Kogi State Agricultural Empowerment Program and Youth Empowerment in Agriculture Program (YEAP) aim to bridge these gaps, but their impact remains limited. Learning and creativity play a big role in keeping young people interested in farming. Encouraging entrepreneurship and reshaping the image of agriculture can make the sector more appealing. Despite its agricultural potential, Kogi State continues to face low youth participation caused by weak infrastructure, lack of credit access, and restrictive land tenure systems. Addressing these issues requires comprehensive policies that strengthen education, mentorship, finance, and infrastructure while promoting innovation and entrepreneurship (Olorunfemi et al., 2022). This study examined rural youth participation in agricultural development programs in Kogi State, Nigeria. Specifically, to describe the socio-economic characteristics of rural youths, assess the level of youth participation, identify various Agricultural Development Programmes, describe the benefits derived from agricultural development programs and identify the challenges encountered by rural youth in agricultural development programmes.

METHODOLOGY

The study was conducted in Kogi State, Nigeria. A multistage sampling technique was used to select respondents. In the first stage, 50% of the state's four major agricultural zones (Aiyetoro-Gbede, Anyigba, Koton-Karfe, and Alloma) were purposively selected based on the intensity of farming activities. In the second stage, 70% of communities with active youth participation in agriculture were chosen from the selected zones. Finally, in the third stage, 15 rural youths were randomly selected from each community, giving a total of 150 respondents for the study. Primary data were collected using a structured questionnaire administered to rural youths. Data collected were analysed using both descriptive such as frequency, percentages and mean.

RESULTS AND DISCUSSION

Table 1 highlights the socio-economic characteristics of rural youths participating in Agricultural Development Programs (ADPs) in Kogi State. The findings show a strong gender

imbalance, with 70% male and 30% female participants, reflecting socio-cultural norms that limit women's visibility in agricultural programs (Amadi & Okafor, 2022). Most respondents (51%) were aged 25–30 years indicating that the participants were in their most productive and innovative years (Salami et al., 2023). Educational levels were relatively high, as 53% had tertiary education and 38% had secondary education, suggesting strong literacy that supports technology adoption and agribusiness development. Majority (58%) were married, with an average household size of four persons, reflecting small, stable family units that enhance resource management. Before joining ADPs, 51% earned ≤₦50,000 monthly, but after participation, 68% earned above this level, showing improved income and livelihood outcomes (Salami et al., 2023). Farming experience was moderate, with 47% having 6–10 years, while farm size increased notably those cultivating above three hectares rose from 28% to 60%, indicating enhanced resource access and confidence in farming profitability. All respondents belonged to cooperatives, received training, and 91% had extension contact.

Table 1. Socioeconomic characteristics of respondents (n=150)

Variable	Frequency	Percentage (%)	Mean
Sex	105	70.0	
Male	45	30.0	
Female			
Age (Years)	54	36.0	
19–24			
25–30	76	50.7	28 years
31–35	20	13.3	
Marital Status			
Single	63	42.0	
Married	87	58.0	
Household Size	24	16.0	
1–3			
4–6	122	81.3	4
>6	4	2.7	
Education			
Primary	13	8.7	
Secondary	57	38.0	
Tertiary	80	53.3	
Monthly Income (₦)			
≤50,000	48	32.0	
51,000–100,000	79	52.7	
>10	53	35.3	
Farm Size Before ADP (ha)			
≤3	108	72.0	
>3	42	28.0	
Farm Size After ADP (ha)			
≤3	60	40.0	
>3	90	60.0	
Extension Contact			
Yes	137	91.3	
No	13	8.7	
ADP Training Received			
Yes	150	100.0	
Association Membership			
Yes	150	100.0	

Participation of rural youth in agricultural development programs

Table 2 reveals that all respondents (100%) participated in at least one Agricultural Development Program (ADP), with many involved in multiple initiatives. The most popular programs were the Kogi Cassava Outgrowers Scheme (93.3%), Agricultural Empowerment Program (86.7%), RAAMP (86.7%), and Fadama Development Program (84.7%). This shows youths' strong preference for profitable crop-based projects, particularly cassava and rice, due to their market stability (Salami et al., 2023).

Table 2: Participation of Rural Youth in Agricultural Development Programs (n=150)

Programs	Percentage (%)
Fadama Development Program (FDP)	84.7
Agricultural Empowerment Program (AEP)	86.7
Youth Empowerment in Agriculture Program (YEAP)	79.3
Kogi Cassava Outgrowers Scheme (KCOS)	93.3
Accelerated Rice Production Project (KARPP)	84.0
Rural Access and Agricultural Marketing Project (RAAMP)	86.7

Benefits derived from agricultural development programs

Table 3 reveals significant improvements in livelihood and productivity indicators among rural youth after participating in Agricultural Development Programs (ADPs). Average monthly income rose from ₦44,400 to ₦66,800—a 50% increase—driven by higher yields, better market access, and value addition (Adebayo et al., 2021; World Bank, 2021). Farm sizes expanded by 2–3 hectares, boosting productivity from 5–6 to over 10 tons per hectare. Over half of the participants acquired new skills in agronomic practices, agribusiness, and record keeping, reflecting the impact of targeted training (Ogunjirin & Ayodele, 2023). Access to credit rose sharply from 50% to 98.7%, enabling investment and expansion (Salami et al., 2023). Improved market linkages through cooperatives and processing firms strengthened bargaining power and shifted youth farming from subsistence to commercially oriented production.

Table 3: Benefit derives by rural youth before and after ADP participation (n=150)

Key indicators	Before ADP participation	After ADP participation	Observed change
Monthly Income (₦)	Mean = ₦44,400	Mean = ₦66,800	+₦22,400 (~50% increase)
Farm Size (hectares)	Mostly 2–3 ha	Mostly 5–6 ha	+2 to 3 ha
Crop Variety Cultivated	1–2 crop types	3–5 crop types	+ More crop diversification
Farm Production (tons/ha)	5–6 tons per ha	10+ tons per ha	+ Higher yield
Skills Acquired	31.3% had minimal skills	53.3% acquired moderate to advanced skills	+22% skill increase
Access to Credit	Around 50% had access	98.7% had access	+48.7% increase
Farm Input Support	Inconsistent or unaffordable	Access to subsidized/improved inputs	+ Better input availability
Market Access	Limited to local markets	Expanded to cooperatives, aggregation centres	+ Improved sales channels

Challenges faced by rural youth in participating in Agricultural Development Programs

The most critical constraint faced by respondents was Environmental challenges such as erratic rainfall, flooding, and pest outbreaks affected 78% of youth, highlighting the urgent need for climate-smart interventions. Training deficiencies were also common, 70.7% found sessions too generic or irregular, underscoring the importance of continuous, practical mentorship. About 67.3% cited weak information flow due to poor extension communication, which limited access to programs and markets (Afolayan & Ibrahim, 2022). Institutional weaknesses, including irregular funding (64.7%) and weak government support (61.3%), reduced program credibility.

Table 5: Challenges to Participation in Agricultural Development Programs (n=150)

Challenges identified	Percentage (%)	Rank
Climate change and environmental challenges	78.0	1st
Inadequate training opportunities	70.7	2nd
Limited access to information	67.3	3rd
Poor funding of agricultural programs	64.7	4th
Limited government support	61.3	5th
Lack of awareness of available programs	59.3	6th
Gender bias and discrimination	51.3	7th
Security challenges (e.g., theft, herder conflicts)	48.0	8th
Poor service quality from ADP officers	46.7	9th
Poor quality of agro inputs (seeds, fertilizer, etc.)	42.7	10th

CONCLUSION AND RECOMMENDATION

This study reveals that Agricultural Development Programs (ADPs) in Kogi State have greatly improved rural youths' livelihoods by raising incomes, expanding farms, boosting productivity, and enhancing skills, credit, and market access. Widespread participation shows that these programs are vital for promoting youth engagement and advancing commercial agriculture. However, challenges such as limited finance, climate shocks, weak training and extension services, insecurity, and gender inequality still hinder progress. Addressing these barriers through youth-focused financing, climate-smart practices, and continuous mentorship is essential. Equally important are transparent governance, adequate funding, and inclusive policies to strengthen program impact.

REFERENCES

Adebayo, S. O., Lawal, A. I., & Ojo, T. M. (2021). Determinants of youth engagement in agricultural programs in Nigeria: Evidence from the Anchor Borrowers Programme. *Nigerian Journal of Agricultural Extension, 22*(1), 45–57.

Amadi, K., & Okafor, P. (2022). Gender dynamics and youth participation in agricultural programs in Nigeria: Challenges and opportunities. *Journal of Gender Studies in Agriculture, 8*(1), 24–35.

Aliyu, M., & Adegboye, A. (2023). Evaluating the Kogi State Agricultural Empowerment Program and its impact on youth productivity and livelihood security. *International Journal of Agricultural Extension and Rural Development, 9*(2), 198–211.

Olorunfemi, D. A., Ajayi, A. A., & Ekundayo, B. A. (2022). Extension services and rural youth empowerment through agricultural programmes in Nigeria: A policy review. *Journal of Agricultural Policy and Rural Development, 10*(1), 22–38. https://doi.org/10.1080/jaard.2022.10.1.22

Olorunfemi, S., Abubakar, M., & Olabode, T. (2022). The impact of cooperative associations on rural youth access to agricultural resources in Nigeria. *International Journal of Cooperative Studies, 10*(1), 121–132.

FACTORS INFLUENCING INFORMATION ACQUISITION FROM AGRICULTURAL RADIO PROGRAMMES AMONG MAIZE FARMERS IN OYO STATE, NIGERIA

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ABSTRACT
This study examined factors influencing information acquisition from agricultural radio programmes among maize farmers in Oyo State, Nigeria. A multistage sampling procedure was adopted to select 132 respondents for the study. A structured questionnaire and interview schedule were used to obtain data on respondents' socioeconomic characteristics, listenership patterns, agricultural information needs, and agricultural information acquired from radio programmes. Data were analysed using descriptive statistics, Pearson product-moment correlation, and multiple linear regression. The results show that respondents were in their productive years (47.3 ± 9.6 years), predominantly male (75.8%), married (93.2%), and had completed secondary education (46.2%). Most respondents (90.0%) owned radio sets, preferred listening in the evenings (67%), and mainly acquired agricultural information in lecture format ($\bar{x}$ = 1.36) from *Agbedotun* programme ($\bar{x}$ = 1.42). Weather forecast ($\bar{x}$=1.64), agricultural credit ($\bar{x}$=1.41), and new maize seed varieties ($\bar{x}$=1.39) ranked highest among respondents' information needs. Further analysis revealed a weak positive correlation between information acquired and information needs (r = 0.159, p = 0.069), suggesting that respondents with higher needs may seek and acquire more information. Farmers' sex (β = 1.580, p = 0.033), marital status (β = –3.322, p = 0.013), years of farming experience (β = 0.113, p = 0.045), membership in farmers association (β = –2.234, p = 0.044), and information needs (β = 0.164, p = 0.046) significantly influenced information acquisition. It is recommended that programme managers assess farmers' information needs before design and broadcast, and adopt participatory, farmer-friendly formats and timing to achieve desired impact.

Keywords: Radio programme, Agricultural information, Information need, Listenership, Maize farmers.

INTRODUCTION

In agriculture, the role of information in enhancing agricultural development cannot be overemphasized. Access to the right information among farmers significantly leads to sustainable agricultural development (Lughlugh, 2020). However, lack of access to accurate and relevant agricultural information by small-scale farmers is a major constraint to improving the agricultural sector in Nigeria. Information need refers to the lack of appropriate information on which to base choices that could lead to improved people's well-being (Tester, 1992). Failure to meet arable crop farmers' information needs will result in poor production output and negatively affect their livelihoods. The high output of agricultural research in recent times has created a large pool of new agricultural technologies that must be disseminated to farmers. Utilisation of improved farm practices requires adequate and effective information. Providing timely information on weather trends, best farming practices, and market access helps the farmers make informed decisions. However, the low farmer-extension ratio limits the dissemination of agricultural knowledge through face-to-face communication in rural areas in Nigeria. In this context, mass media, especially radio, offer a cost-effective platform to reach a larger audience of farmers. Agricultural radio programmes can reach a large audience at once, but it is crucial that these messages are tailored to the farmers' information needs. This ensures farmers can fully maximize the knowledge gained and apply it, resulting in improved yields and livelihoods.

Farmers need timely information at every stage of production, especially for climate-sensitive crops like maize in Southwest Nigeria. Maize production is critical for food security and the socioeconomic stability of Nigeria and sub-Saharan Africa (Ibitola *et al.*, 2019). Studies on agricultural communication show that farmers listen to different agricultural radio broadcasts (Badiru & Adekoya, 2014; AnjolaOluwa & Benjamin, 2019). Several studies have also examined farmers' information needs (Owolabi *et al.*, 2018; Olaniyi & Ogunkunle, 2018). However, there is limited knowledge on factors influencing information acquisition from agricultural radio programmes among farmers in Oyo State, Nigeria, thereby necessitating this study. Thus, this study examined these factors among maize farmers in Oyo State. Specifically, the study

1. Described the socioeconomic characteristics of respondents in the study area
2. Examined the listenership pattern of respondents in the study area
3. Identified the information needs of respondents in the study area
4. Ascertained agricultural information acquired by respondents through agricultural radio programmes
5. Assessed the factors influencing information acquisition of respondents from agricultural radio programmes

METHODOLOGY

The study was carried out in Oyo State, located in Southwestern Nigeria. A multistage sampling procedure was adopted to select 132 respondents for the study. A structured questionnaire and interview

schedule were used to obtain data, which was analysed using descriptive statistics, Pearson product-moment correlation, and multiple linear regression.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results in Table 1 show that respondents were in their productive years with a mean age of 47.3 ± 9.6 years), predominantly male (75.8%), married (93.2%), and had completed secondary education (46.2%). The mean years of farming experience was 18.6 ± 9.9 years. About 69.7% of the respondents had a total farm size of 5 acres or less, and 37.9% of them belonged to maize farmers' associations. Approximately 34.1% of respondents had maize yields between 501 to 1000 kg/year.

Table 1: Distribution of respondents according to their socio-economic characteristics (n=132)

Variables	Frequency	Percentage	Mean	Standard Deviation
Age				
≤ 47	58	42.6	47.3	9.6
> 47	74	54.4		
Sex				
Male	100	75.8		
Female	32	24.2		
Marital status				
Single	6	4.5		
Married	123	93.2		
Widowed	3	2.3		
Educational level				
No formal education	13	9.8		
Primary school	33	25.0		
Secondary school	61	46.2		
Tertiary education	22	16.7		
Adult education	3	2.3		
Farm size				
<5	92	69.7	4.6	3.0
6-10	35	26.5		
>10	5	3.8		
Farm experience				
<10	42	31.8	18.6	9.9
11-20	43	32.6		
21-30	35	26.5		
>30	12	9.1		
Maize yield (kg)				
<500kg	9	6.8	1585.6	1106.5
501-1000kg	45	34.1		
1001-1500kg	38	28.8		
1501-2000kg	13	9.8		
>2000kg	27	20.5		
Membership of association				
Non member	82	62.1		
Member	50	37.9		

Source: Field survey, 2021

Listenership pattern of respondents

As indicated in Table 2, most respondents (90.0%) owned radio sets, preferred listening in the evenings (67%), and mainly acquired agricultural information in lecture format ($\bar{x}$ = 1.36). Going by the means of respondents' listenership frequency to these programmes, Agbedotun ($\bar{x}$=1.42) was the most frequently listened to programme followed by Ere-agbe ($\bar{x}$=0.9).

Table 2: Distribution according to listenership pattern of respondents in the study area (n=132)

Variable	Frequency/Percentage	Mean ($\bar{x}$)
Radio ownership		
Own radio set	90%	
Do not own but have access (via peers, friends, etc.)	10%	
Preferred listening time		
Evening	67%	
Afternoon	26%	
Night	5%	
Morning	2%	
Listenership frequency		
Agbedotun (Oluyole FM, Ajilete FM & Oke-Ogun FM)		1.42
Ere-agbe (Amuludun FM)		0.90
Agbe-Korede (Lagelu FM)		0.65
Tiwa-lagbe (Amuludun FM)		0.58
Ore-Agbe (Premier FM)		0.50
Programme format preference		
Lecture		1.36
Discussion/Talk show		1.20
Phone-in programme		1.08
Interview		0.86
Drama		0.83

Source: Field survey, 2021

Information needs of respondents and information acquired through radio programmes

Weather forecast ($\bar{x}$=1.64), agricultural credit ($\bar{x}$=1.41), and new maize seed varieties ($\bar{x}$=1.39) ranked highest among respondents' information needs. Information on pest control ($\bar{x}$=0.92), new varieties ($\bar{x}$=0.86), choice of fertilizer ($\bar{x}$=0.86), and appropriate time for pesticide application ($\bar{x}$=0.85), were the top information mostly acquired through agricultural programmes broadcast.

Table 3: Distribution of respondents according to their information needs and information acquired through agricultural radio programmes

Variable	Information need: Mean ($\bar{x}$)	Information acquired: Mean ($\bar{x}$)
Field preparation	0.19	0.61
Planting time and methods	0.30	0.69
Where to get farm input	1.08	0.77
New varieties of maize seed	1.39	0.86
Choice of fertilizer to apply	0.68	0.86
Fertilizer application	0.48	0.63
Pest infestation	1.13	0.81
Disease infestation	1.16	0.70
Pest control	1.36	0.92
Disease control	1.38	0.79
Appropriate time for pesticide application	1.15	0.85
Harvest period	0.15	0.60
Remunerative market for maize	1.19	0.30
Post-harvest handling	0.77	0.70
Agricultural credit	1.41	0.17
Weather forecast information	1.64	0.49
Choice of alternative crops during delay of rain	0.67	0.63
Climate-smart practices	1.36	0.42
Effective storage of maize	0.61	0.62
Aflatoxin control in maize	1.29	0.20

Source: Field survey, 2021

Correlation between information needs and information acquired by respondents through agricultural radio programmes

A weak positive correlation was found between the information acquired and the information needs of the respondents (r = 0.159, p = 0.069). This suggests that respondents with higher information needs may seek and acquire more information.

Table 4: Correlation between information needs and information acquired by respondents

Variable	r- value	p-value	Decision
Information needs and information acquired	0.159	0.069	S*

Source: Field survey, 2021 *p < 0.10

Factors influencing information acquisition of respondents from agricultural radio programmes

Farmers' sex (β = 1.580, *p* = 0.033), marital status (β = –3.322, *p* = 0.013), years of farming experience (β = 0.113, *p* = 0.045), membership in farmers association (β = –2.234, *p* = 0.044), and information needs (β = 0.164, *p* = 0.046) significantly influenced information acquisition.

Table 5: Factors influencing information acquisition of respondents from agricultural radio programmes

Variable	Coefficient (β)	p-value
Sex	1.580	0.033**
Marital status	-3.322	0.013**
Years of farming experience	0.113	0.045**
Membership in farmers' association	-2.234	0.044**
Information needs	0.164	0.046**

Source: Field survey, 2021 R^2 = 0.309, Adjusted R^2 = 0.233 **Significant at 5% level

CONCLUSION AND RECOMMENDATIONS

The study concludes that while radio remains accessible to most respondents in the study area, their socioeconomic and social attributes influence their acquisition of information from agricultural radio programmes. It is therefore recommended that programme managers assess farmers' information needs before design and broadcast, and adopt participatory, farmer-friendly formats and timing to achieve desired impact.

REFERENCES

AnjolaOluwa, O. F., & Benjamin, O. O. (2019). Listenership of Latoju oja radio extension programme among farmers in Oyo State, Nigeria. *Journal of Agricultural Extension*, *23*(1), 66–78. https://doi.org/10.4314/jae.v23i1.06

Badiru, I., & Adekoya, A. (2014). Private Sponsorship of Rural Development Broadcasts on Radio in Southwest Nigeria. *Journal of Agricultu ral Extension*, *18*(1), 109. https://doi.org/1 0.4314/JAE.V18I1.10

Ibitola, O. R., Fasakin, I. J., Popoola, O. O., & Olajide, O. O. (2019). Determinants of Maize Farmers' Productivity among Smallholder Farmers in Oyo State, Nigeria. *Greener Journal of Agricultural Sciences*, *9*(2), 189–198. https://doi.org/10.15580/gjas.2019.2.0402 19062

Lughlugh, J. (2020). Information Needs and Information Seeking Behaviour of Farmers for Sustainable Agricultural Development in Benue State, Nigeria. *International Journal of Research and Innovation in Social Science*, *4*(5), 309–312.

Olaniyi, O. A., & Ogunkunle, T. (2018). Agricultural and nutritional information needs of arable crop farmers in Ondo State, Nigeria. *Journal of Agricultural Extension*, *22*(3), 9-21.

Owolabi, K. E., Ajayi, F. O., & Tomori, R. O. (2018). Assessment of Agroclimatological Information Needs of Selected Arable Crop Farmers (Maize and Cassava Farmers) in Akinyele and Egbeda Local Government, Oyo State, Nigeria. *4*(03), 1519–1529. https://doi.org/10.18535/rajar/v4i3.06

Tester, S. (1992). *Common knowledge: a coordinated approach to information-giving*. 100.

EFFECTIVENESS OF EMPOWERMENT ACTIVTIES ON YOUNG ENTREPRENEURS IN IBARAPA AREA OF OYO STATE, NIGERIA

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ABSTRACT
The study assessed the effectiveness of empowerment activities on young entrepreneurs in Ibarapa Area of Oyo State, Nigeria. The population for the study was young entrepreneurs in the study area. Two- stage sampling procedure was employed to select 104 respondents for the study. Primary data were sourced through structured interview schedule and analysed using descriptive and inferential statistical tools (Chi-square and Pearson Product Moment Correlation). Majority of the respondents (80.8%) were married. Above 60.0% of the respondents were between the age range of 31-35years with mean age of 34years. Majority of the respondents (71.2%) had household size of between 4-6 persons with mean of 4 persons. Little to 50.0% of the respondents earned average monthly income of between 51,000- 100,000, and mean income 87,490:38. Most of the respondents did not benefit from the empowerment programmes considered (83.7%) from Oyo State Investment and Public Private Partnership Agency (OYSIPA), 81.7% from Government Enterprises Empowerment Programs (GEEP). On effectiveness of the programmes available to the respondents, socio-economic impact ranked1st (0.79), lack of access to finance was the major constraint (0.53). There was a significant relationship between respondents level of education (χ^2=31.210), sex (χ^2= 62.639) and marital status (χ^2=121.639) and effectiveness of entrepreneurial activities. It is recommended that there should be eradication of corrupt practices among people in position of authority so that empowerment programmes introduced by the government can succeed.
Keywords: Young entrepreneur, Empowerment, Entrepreneurial activities

INTRODUCTION

Youth unemployment remains one of the most pressing challenges affecting sustainable economic growth and development in Nigeria. Despite the nation's abundant human and natural resources, a significant proportion of the youth population continues to grapple with joblessness, underemployment, and financial insecurity. In Nigeria, the National Youth Policy defines youth as persons aged 18 to 35 years, acknowledging their unique developmental and socio-economic realities (Federal Republic of Nigeria, 2019).

The Nigerian government has, over the years, initiated several empowerment programmes targeted at small and medium-scale enterprises (SMEs) with the aim of equipping young people with the necessary skills and resources for entrepreneurship. Such programmes, when effective, do not only enhance innovation and creativity but also contribute to poverty reduction and local development (Wilson and Blumenthal, 2018; Iheonurekwu, 2023). Despite these interventions, unemployment rates remain high, and many youths still struggle to access and benefit from empowerment programmes (Garba, 2020; Ojeagu, 2021). Studies have shown that inadequate access to finance, poor awareness, socio-cultural barriers, and weak institutional support are key challenges limiting the effectiveness of such initiatives (Oviawe and Anavberokha, 2018). The situation is particularly concerning in rural settings like Ibarapa, where infrastructural deficits and economic instability exacerbate the problem. It is against this background that this study examined the effectiveness of empowerment on young entrepreneurs activities in Ibarapa Area of Oyo State. Specifically, it identified different empowerment programmes available to youth entrepreneurs, examined the effectiveness of these empowerment programmes on youth entrepreneurial activities and identified the constraints to participation of youth empowerment on their entrepreneurial skills in the study area.

METHODOLOGY

The Ibarapas are group of Yoruba people located in the Southwestern corner of Oyo State. The Ibarapa area falls within latitudes 70.15' N and 70.55' N and longitudes 30E and 30.30' E. Ibarapa land is traditionally made up of 7 principal towns known Igangan, Ayete, Tapa, Idere, Igboora, Lanlate and Eruwa.

Samples were drawn from the study via two-stage sampling procedure: Stage 1: 50% of towns were selected across Ibarapa Area. Ayete and Tapa were randomly selected from Ibarapa North, Eruwa from Ibarapa East and Igboora from Ibarapa Central. Stage 2: 20% of youth entrepreneurs were selected from the list of the registered entrepreneurs in the study area to have equal representation as follows; Ibarapa North - 120= 24, Ibarapa East - 175= 35, Ibarapa Central - 225 = 45 to make 104 respondents. Data was sourced using structured interview schedules and were analysed using descriptive and inferential statistical tools.

RESULTS AND DISCUSSION

Results on table 1 shows that substantial number of the youth in the study area did not benefit from the empowerment programmes to foster their entrepreneurial activities. This finding is consistent with Wilson and Blumenthal (2018), who emphasized that urging youth to become productive citizens and entrepreneurs is insufficient without equipping them with the necessary skills and resources.

Table 1: Distribution of respondents on empowerment programs within the study area

	Empowerment programmes	Benefited		Not Benefited	
		F	%	F	%
1	OYSG Youth Entrepreneurship in Agriculture (YES-O)	40	38.5	64	61.5
2	Oyo State Agri-Business Development Agency (OYSADA)	46	44.2	58	55.8
3	Oyo State Women Empowerment Programme (OYS-WEB)	33	31.7	71	68.3
4	Oyo State Investment and Public Private Partnership Agency (OYSIPA)	15	14.4	87	83.7
5	National Social Investment Program (NSIP) eg Empower Program.				
	Government Enterprises Empowerment Programs GEEP	19	18.3	85	81.7
	YES-O	22	21.2	82	78.8
	Conditional Cash Transfer	24	23.1	80	76.9
	Trader Money	19	18.3	85	81.7
6	Oyo State Micro, Small and Medium Enterprise Development Program (MEMEs)	23	22.1	81	77.9
7	Start Them Early Program (STEP)	24	23.1	80	76.9
8	Oyo State Cooperative Society	40	38.5	64	61.5

Source: Field Survey, 2024
Keys: F - Frequency % - Percentage

Table 2 revealed effectiveness of empowerment program on the Youth entrepreneurial activities in the study area. From the data, Socio Economic Impact ranked 1st with Weighted Mean Score (WMS) of 0.79. This conforms to the findings of Iheonurekwu (2023), that a clear manifestation of effective manipulation of human intelligence is demonstrated in creative performance.

Table 2: Distribution of the respondents on effectiveness of available empowerment programmes on youth entrepreneurial activities in study area

Effectiveness Variables	Very Effective		Effective		Not Effective		WMS	Rank
	F	%	F	%	F	%		
Socio economic Impact.	23	22.1	36	34.6	45	43.3	0.79	1st
Innovation and Creativity	19	18.3	41	39.4	44	3	0.76	2nd
Increase Business Start-Up	23	22.1	31	29.8	50	48.1	0.74	3rd
Sustainability of Business	24	23.0	27	26.0	53	51.0	0.72	4th
Job Creation	23	22.1	25	24.0	56	53.8	0.68	5th
Networking Opportunities	20	19.2	29	27.9	55	52.9	0.66	6th
Reduction in Crime and Social Vices	20	19.2	24	23.1	60	57.7	0.62	7th
Skill Acquisition and Development	18	17.3	24	23.1	62	59.6	0.58	8th
Improved Access to Funding	17	16.3	23	22.1	64	61.5	0.55	9th
Enhance Economic Stability	17	16.3	16	15.4	71	68.3	0.48	10th

Source: Field Survey, 2024
Keys: F-Frequency %-Percentage WMS - Weighted Mean Score

Results in Table 3 revealed the constraints of empowerment on youth entrepreneurial activities, Lack of access to finance with mean of 0.90 ranked 1st, Cultural and Social norms ranked 2nd with mean of 0.82, Economic instability ranked 3rd with mean of 0.78 while High competition ranked 12th with mean of 0.53.

In Table 4, the result revealed a significant relationship between level of education (χ^2=125.327); gender (χ^2=5.538) and marital status (χ^2=105.365) on effectiveness of empowerment on youth entrepreneurial activities in the study area.

Table 3: Constraints to effectiveness of empowerment on youth entrepreneurial activities

Constraints	Weighted mean score	Rank
Lack of access to finance.	0.90	1st
Cultural and social norms	0.82	2nd
Economic instability	0.78	3rd
Inadequate education and skills	0.76	4th
Government policy and regulation	0.76	4th
Political instability and insecurity	0.70	6th
Limited awareness and outreach	0.69	7th
Infrastructural deficiencies	0.64	8th
Fear of failure	0.61	9th
Lack of mentorship and support network	0.57	10th
Limited access to markets	0.56	11th
High competition	0.53	12th

Source: Field survey, 2024

Table 4: Chi-square test showing relationship between socio economic characteristics of the respondents and effectiveness of empowerment on entrepreneurial activities

Variable	χ^2	df	p- value	Decision
Gender	5.538	1	0.019	S
Marital Status	105.365	2	0.000	S
Educational Level	125.327	4	0.000	S

Source: Data analysis, 2024 Chi-square Test (χ^2)

Table 5 revealed there is a significant relationship between constraints faced by respondents on effectiveness of empowerment on the youth entrepreneurial activities in the study area (r-value = -0.239(*); p- value = 0.015).

Table 5: PPMC test showing relationship between constraints faced on the effectiveness of empowerment on youth entrepreneurial activities in the study area

Variable	r - value	p - value	Decision
Constraints faced /Effectiveness	--0.239(*)	0.015	S

Source: Data analysis, 2024

CONCLUSION AND RECOMMENDATIONS

The study revealed that while empowerment programmes in Ibarapa Area have the potential to boost youth entrepreneurial activities by fostering innovation, business start-ups, and socio-economic improvement, many youths have not benefited due to financial constraints, cultural barriers, and economic instability. Socio-economic characteristics such as education, gender, and marital status were found to significantly influence access to these programmes, highlighting gaps in inclusiveness and effectiveness. It is therefore recommended that young entrepreneurs be given better access to finance through loans and grants with flexible conditions.

REFERENCES

Federal Republic of Nigeria (2019). *National Youth Policy of the Federal Republic of Nigeria*. Abuja: Federal Ministry of Youth and Sports Development.

Garba, A. (2020). Tackling youth unemployment in Nigeria: Issues, challenges and policy options. *Nigerian Journal of Economic and Social Studies*, 62(1), 45 59.

Iheonurekwu, S. C. (2023). Human capital development and entrepreneurial innovation among Nigerian youths. *African Journal of Management and Development Studies*, 14(2), 89 102.

Ojeagu, A. I. (2021). Graduate unemployment in Nigeria: The role of entrepreneurship education. *Journal of Vocational and Technical Education Research*, 13(1), 77 85.

Oviawe, J. I. and Anavberokha, K. (2018). Harnessing entrepreneurship skills for youth empowerment in Nigeria. *Nigerian Journal of Educational Research and Evaluation*, 17(2), 101 113.

Wilson, J. and Blumenthal, P. (2018). Youth empowerment and the dynamics of entrepreneurial success. *International Review of Economics and Business Research*, 11(5), 210 225.

PERCEPTION OF EXTENSION AGENTS ON BIOCHAR PRODUCTION TECHNOLOGY IN OGUN AND OYO STATES, SOUTHWEST NIGERIA.

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ABSTRACT

Agricultural extension services in Nigeria are faced with many challenges, which include inadequate training, finance, poor extension-farmer linkage, large extension/farmer ratio. The study assessed the knowledge level of extension agents and their perception on biochar production technology in both Oyo and Ogun states, Nigeria. Simple random sampling technique was used to select respondents for the study. Primary data was obtained through administered questionnaires and data were analysed using frequency counts, percentages, means, chi-square, and Pearson Product Moment Correlation (PPMC). The mean age, academic qualification, years of experience. Actual income of extension agents in Oyo and Ogun states was 43 and 48 years, 71 and 67 % had HND/B.Sc./B.Agric. and a mean of 17 years of experience, respectively. Extension agents had high functional knowledge of 57.7% and their perceptions towards biochar technology revealed that 56.7% had unfavourable perception. The study concluded that majority of extension personnel need more training, provision of facilities and equipment to support training and effective delivery in the area of information dissemination.

Keywords: Knowledge, Extension agent, Perception, Biochar production, technology

INTRODUCTION

The Agricultural sector has been the mainstay of the economy since independence, but gradually has experienced several challenges, one of the many challenges faced by farmers according to Sunday *et al*. (2015) are the problem of land degradation, depletion of soil nutrient as a result of biological and economic activities, completely rain fed crop land, human habitation pattern and degradation, and the following potentially undermine effort towards sustainable agricultural production and so pose a major threat to future of agriculture in Nigeria. According to Ufiobor (2017) Nigerian is unable to produce adequate good for the poor and heavily dependent on food importation hence the needs intensity effort in order to meet up the rising population demand by 2050.

For sustainable production, biochar technology plays a crucial role by improving the Nigerians soil which is continuously decreasing year in and out. Biochar is a pyrolyzed charred biomass also commonly known as Agrichar (charcoal for farming) produced by exothermic process called pyrolysis. Biochar has physio chemical properties suitable for the safe and long-term storage of carbon in the environment and also has the potential capacity to improve the soil Zhan get al (2017). Biochar according to Ndor et al (2015) retreat the capacity of biochar to retain water in the soil, it also helps to improve soil fertility and increase the soil Ph, soil, it helps to increase the cation exchange capacity (CEC), nitrogen (N) content improving the micro communities and carbon sequestration of the soil. Despite the potential benefit of biochar technology, the application of biochar technology among farmers is low, which could also be attributed to the knowledge of extension agent on biochar production and their perception on production technology that have great impact on their willingness to disseminate information to farmers. The role of extension agents cannot be over-emphasized in Nigeria; they play active role in knowledge discrimination. According to Anaete (2012), agricultural extension agent played key role in agricultural development they are intermediary between research institutes and farmers, if the extension agent does not have the knowledge of the technology, the application and adoption may be affected hence the need to enlighten the extension agent on such technology. In view of the above information, the assessments of extension agent knowledge on biochar production technology and perception hence become crucial.

Objectives of the study

1. Describe the socioeconomic characteristics of extension agents in the study area
2. Determine the level of knowledge of extension agents on biochar production technology.
3. Ascertain the extension agents' perception of biochar production technology.

Hypothesis of the study was stated that there is no significant relationship between level of knowledge of extension agents and their perception on biochar production technology.

METHODOLOGY

The study was conducted in Oyo and Ogun states. Primary data was obtained through questionnaire. Simple random sampling technique was used to select two hundred and fifteen (215) extension agents from Ogun and Oyo states agriculture development programme staff list that made up of 235 extension agents.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Results in Table 1 revealed that the mean age of agricultural extension in Ogun and Oyo states were 43 and 48 years, respectively. The implication of this result is that most of the extension staff is in their

economical active age. With respect to sex 63.7 % of the respondents were males, while 37.2 % were females in Ogun and Oyo states, respectively.

The study also revealed that 78.5% and 85.6% of the extension agents in Ogun and Oyo State respectively were married, while 71.1% and 67.5% % of the extension agents in Ogun and Oyo States respectively were B.Sc/ HND/ B.Agric graduates.

Results from findings also show that 48.9% and 34.4% of the respondents in Ogun and Oyo States respectively had between 1-10 years of working experience with a mean of 17.0 years and 15.0 years respectively.

Furthermore, the mean monthly income of the respondents in Ogun and Oyo States was N149, 629.73 and N 170,625.33 respectively with 51.8% of the respondents in Ogun State earning between N50,000-N100,000 while 41.3% of the respondents in Oyo State earning between N100,000 - N150,000 on monthly basis.

Table 1: Socio-economic characteristics of Extension agents in Ogun and Oyo States (n=215)

Socioeconomic characteristics	Ogun State			Oyo State			Total	
	Freq	%	Mean	Freq	%	Mean	Freq	%
Age								
21-30	21	15.6		-	-		21	9.8
31-40	40	29.6		7	8.8		47	21.9
41-50	27	20.0		46	57.5		73	34.0
51-60	47	34.8	43.0yrs	26	32.5	48.0yrs	73	34.0
61-70	-	-		1	1.3		1	0.5
Sex								
Male	86	63.7		49	61.3		135	62.8
Female	49	36.3		31	38.8		80	37.2
Marital status								
Single	26	19.3		1	1.3		27	12.6
Married	106	78.5		78	97.5		184	85.6
Divorced	1	0.7		-	-		1	0.5
Widow/widower	2	1.5		1	1.3		3	1.4
Academic qualification								
NCE/OND	7	5.2		13	16.3		20	9.3
HND/BSc./B.Agric	96	71.1		54	67.5		150	69.8
M.Sc/M.Agric	31	23.0		13	16.3		44	20.5
Ph.D	1	0.7		-	-		1	0.5
Years of experience								
1-10	66	48.9		8	10.0		74	34.4
11-20	17	12.6	14.0	53	66.3	17.0	70	32.6
21-30	52	38.5		19	23.8		71	33.0
Actual income per month (N)								
50,000 -100.000	70	51.8		8	10			
100,001- 150,000	8	5.9		33	41.3			
150,001-200,000	4	3.0	149,629.73	7	8.8	170,625.33		
200,001-250,000	16	11.9		12	15			
250,000 and above	37	27.4		20	25			

Functional knowledge of extension agents on biochar production technology

Series of knowledge questions were generated on technology for extension agent and results obtained were categorized into high knowledge and low knowledge with the use of mean score. Results reveal that more than half (57.7%) of the extension agents scored above the mean (25.0) thereby having a high functional knowledge of biochar production while 42.3% scored below the mean (25.0) thereby having a low functional knowledge of biochar production. This shows that the respondents were knowledgeable about the production of biochar and if this knowledge gained is fully incorporated, extension agents will be willing to disseminate Biochar Technology Production to farmers.

Table 2: Categorization of functional knowledge of extension agents on biochar production

Variables	Categorization	Frequency	Percentage	Mean
Low Knowledge	39 – 58.5	91	42.3	25.0
High Knowledge	58.5 – 78	124	57.7	

Categorisation of perception of extension agents on biochar technology production technology

Findings reveal that 56.7% of extension agents score below the mean of 22.3 thereby having unfavourable perception on biochar technology while 43.3% score above the mean of 22.3 thereby having favourable perception on biochar production technology.

Table 3: Categorisation perception of extension agents on biochar technology

Categories	Score range	Frequency	Percentage	Mean	SD
Unfavourable	16-22.3	122	56.7	22.3	3.2
Favourable	22.3-30	93	43.3		

Test of relationship between knowledge gained by extension agent and their perception of biochar production technology using PPMC

The result of hypothesis tested shows no significant relationship between knowledge gained (r=0.010, p=0.883) and their perception of biochar production technology in the study area. This implies that the knowledge of extension agents on biochar technology do not have any influence on their perception of biochar production technology in the study area.

Table 4: Test of relationship between knowledge gained by extension agents and their perception

Variables	r value	p value	Decision
Knowledge gained by extension agent and their perception of biochar production	0.010	0.883	NS

RECOMMENDATIONS

The following were recommended:

1. Extension agents in the study areas should be retrained in other to keep them abreast with Information associated with biochar production technology.
2. Emphasis on the need to provide facilities and equipment to support training and effective delivery for extension agents are very crucial by the researchers in other to promote favourable perception about the technology.

REFERENCES

Anaeto, F. C. 1. Asiabaka, C. C. I, Nnadi, F. N. I. Ajaero, J. O. I., Aja, O. O. I., Ugwoke, F. O. 1., Ukpongeon, A. U. I. and Onweagbe, A. E. (2012) The role of extension officers and extension service in the development of agriculture in Nigeria. Federal University of Technology Owerri, Imo State Nigeria. *Journal of Agriculture Research* 1:(6)

Ndor, E., Amana, S. M. and Asadu, L. A. (2015). Effects of biochar on soil properties and organic carbon-zinc in degraded soil of southern guinea savannah zone, an *International Journal of Soil Science* 4(3):252-258.

Olowoporoku, A. J., Babarinde, S. A., Joshua, A. O., Ajayi. A. Babarinde. I. A., Shiyanbade, B. W., Ajayi, O. A. and Oyebola, B. O. (2017). Challenges of Oyo State Agricultural Development Program (OYSADEP) For Rural Farmers in Oyo State, Southwestern Nigeria – *An International Triannual Journal Technical Report* 5: 8-12.

Sunday, E. O., Mohammed, M. B., John, C. N., Nwite, H. Y. W.,Charles A. I and Toshiyuki, W. (2015). Soil Degradation-Induced Decline in Productivity of Sub-Saharan African Soils: The Prospects of Looking Downwards the Lowlands with the Sawah Ecotechnology Hindawi Publishing Corporation: *A Journal of Applied and Environmental Soil Science Article* ID 673926, doi:10.1155/2012/673926.

Ufiobor. K A (2017). Nigeria Agriculture and sustainability: problem and solution, thesis for bachelor of sustainable coastal management Raseborg. Yakeshogskolan Novia.

Zhang, R., Zhang, Y., Song, L., Song, X., Hänninen, H. and Wu, J. (2017) Biochar enhances nut quality of Torreya grandis and soil fertility under simulated nitrogen deposition. *For. Ecol. Manag.* 391, 321–329. https://doi.org/10.1016/j.foreco. 2017.02.03

A REVIEW OF GENDER DYNAMICS AND IMPACT ON AGRICULTURAL FOOD VALUE CHAIN SECTOR IN NIGERIA: POLICY IMPLICATIONS FOR SUSTAINABILITY

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ABSTRACT
This paper examines the influence of gender dynamics on various stages of the Nigeria's agri-food sector. The specific objectives were to: examine the role of gender dynamics in impacting value chain efficiency; identify specific barriers encountered by women in the agri-food sector; examine the various participatory approaches for addressing gender disparities in agri-food sector; propose policy recommendations that can enhance gender equity and sustainability in the agri-food sector. The literature search was carried out in a number of authoritative databases, including Google Scholar, Scopus, Web of Science and Directory of the Open Access Journals. To ensure a comprehensive review, only papers published between 2015 and 2025 have been taken into account. A total of 50 manuscripts were identified, 23 of which met the criteria and were included in the review. The various gender roles across the agri-food value chain in processing and retailing, production and logistics and regional variations in gender participation were examined. Some barriers limiting women's participation in agri-food includes, cultural norms, land tenure systems, limited access to inputs and credit, low representation in cooperatives and training programmes. Emerging approaches to address gender disparities in Nigeria's agri-food sector comprises community-led awareness and advocacy, inclusive extension models and involving men as partners in gender equity. In conclusion, policies that prioritize gender parity can significantly improve agricultural productivity and resilience, both of which are critical for food security and economic growth. Improving gender-responsive budgeting, enhancing access to mechanization and inputs, and instituting gender audits in agricultural programmes were policies recommended.
Keywords: Gender dynamics, Value chain, Policy, Sustainability, Participatory approaches

INTRODUCTION

Gender disparity in Nigeria's agricultural sector is a significant issue, influenced by socio-economic inequalities, cultural constraints, and institutional biases, affecting economic stability and food security. (Abolade, 2021). Women constitute nearly half of Nigeria's agricultural workforce yet, faces marginalization in decision-making and resource access, affecting productivity and sustainability. This imbalance impacts food security and economic growth, as agriculture contributes 24.18% to Nigeria's GDP (Olonade et al., 2021).

Research shows that equal participation of women in agri-food value chains leads to improved yields, better nutrition outcomes for families and increased resilience against economic fluctuations. The persistent gender gap in access to critical resources like land, credit, and technology hinders women's contributions to the value chain, necessitating Nigerian policy frameworks to promote gender equity in agricultural policies and programs (Idris-Adeniyi et al., 2021).

The motivation for this study arises from the need to address these gender disparities and their implications for the agri-food value chain in Nigeria. The objectives are threefold: first, to examine the role of gender dynamics in impacting value chain efficiency; identify specific barriers encountered by women in the agri-food sector; examine the various participatory approaches that have emerged for addressing gender disparities in Nigeria's agri-food sector, and; propose policy recommendations that can enhance gender equity and sustainability in the agri-food sector.

METHODOLOGY

Search strategy and sources - The search criteria were conducted in academic and grey literature databases between 2015 and 2025, including Google Scholar, ResearchGate, institutional repositories, Nigerian agricultural journals and open-access conference proceedings.

Inclusion and exclusion criteria - Included: empirical studies, case studies, program reports, and systematic reviews that (a) involve Nigeria (or Nigerian states), (b) explicitly examine gender dynamics and impact on agricultural food value chain sector and (c) report barriers, participatory approaches or policy and programmatic recommendations.

Excluded: purely conceptual papers with no Nigeria evidence, studies not related to agriculture, and items published in languages other than English.

RESULTS DISCUSSIONS

Gender roles across the agri-food value chain - Nigeria's agri-food sector exhibits gender-specific labour divisions due to social norms assigning roles to men and women, resulting in distinct patterns of resource participation and control.

i. Production and logistics - Men hold significant control over the production aspects of the value chain in agriculture, engaging in labour-intensive tasks such as land clearing and tree felling.

They dominate the agro-input supply sector, owning 81.3% of businesses, and employing 64.8% of male workers. Transportation of agricultural products is also predominantly managed by men, particularly in northern Nigeria, where women's participation in logistics is limited (Olanrewaju et al., 2021).

ii. Processing and retailing - Women primarily dominate the processing landscape in agricultural value chains, especially in informal settings. In contrast, formal processing companies are usually male-owned. They play a key role in value addition, like converting cassava to *garri*. Women excel in retail but face challenges such as limited education and funding. In southern Nigeria, about 80% of market traders are women, while this decreases to 30% in northern areas (Feed the Futrure, 2021).

Regional variations in gender participation - Gender roles in Nigeria's agri-food sector are influenced by cultural, religious, and socioeconomic factors. In the southern regions, female plot managers demonstrate equal productivity compared to their male counterparts, showing no gender gap when controlling for key characteristics. Conversely, in the northern regions, women farmers experience a significant productivity disparity, producing 28% less than men, particularly in wholesale markets (Suleiman, et al., 2020). For instance, women constitute approximately:

i. 30% of green leafy vegetable wholesalers in northern markets versus 80% in southern markets
ii. 20% of tomato wholesalers in the north compared to 80% in the south
iii. 15% of fish wholesalers in the north versus 70% in the south (Research Supporting Africa, 2022).
ii. Conversely, in southern and middle belt states, women own and manage farms with fewer restrictions on crop selection (Development Research and Projects Centre, 2025).

Barriers limiting women's participation in agricultural food value chain

Nigeria's agri-food sector faces structural barriers that hinder women's participation, perpetuating persistent gender inequalities across social, economic and institutional dimensions.

i. Cultural norms and land tenure systems - Cultural norms in rural Nigeria restrict women's participation in agriculture, as men predominantly make decisions regarding production and income distribution. Only 4% of women independently own land, often relying on males for access. Inheritance laws favour sons, granting daughters only 30% of their shares. With 69% of land owned by men, this gender disparity decreases productivity, despite female farmers with secure land rights producing 30% more than their counterparts, yet such inequalities persist in these communities (Pyburn et al., 2023).
ii. Limited access to inputs and credit - Financial exclusion represents another significant barrier. Women face a 15.6% agricultural financing gap compared to male farmers. This disparity stems from multiple factors:
    a. Traditional banks require collateral (often land) that women typically lack.
    b. Only 27% of women in agricultural communities have formal bank accounts.
    c. Female farmers receive less than 10% of available credit despite constituting over 70% of the agricultural workforce
    d. Women encounter obstacles accessing quality inputs.

Male-dominated input supply chains often prioritize male farmers, with female farmers reporting 25% longer wait times for fertilizer access during peak seasons. Female farmers also use 30% less fertilizer per hectare than male counterparts, primarily due to financial constraints rather than choice.

iii. Low representation in cooperatives and training programs - Women's involvement in agricultural cooperatives is significantly low, with 70% of the workforce being female, yet only 25-30% are cooperative members, and merely 12% occupy leadership roles. The bias also extends to capacity-building, as agricultural extension services prioritize male farmers, visiting male-headed farms 4-5 times more than female-headed ones, and only 23% of participants in government training programs are women.

Participatory approaches to bridging the gap - These approaches focus on inclusive decision-making processes that recognize the unique contributions of both men and women throughout the value chain.

i. Community-led sensitization and advocacy - Community-based initiatives are essential for sustainable gender integration in agriculture, with women's groups significantly enhancing female participation. In Nigeria, the 'Women in Agriculture' (WIA) units, staffed by female extension workers, have improved the identification of rural women's specific technical and information needs (Chocholata, 2023).
ii. Inclusive extension models and farmer field schools - Farmer Field Schools utilise participatory and hands-on methodologies that enable both men and women to observe, experiment, and raise concerns about production systems (Chocholata, 2020). The effectiveness of this model is evident in the statistics:

a. 43% of 24,737 farmers trained through FFS were women
b. 30% of 843 facilitators trained were women
c. Women participants gained prominence in their communities, with some becoming farmer-facilitators, advisors, or entering local politics (Chocholata, 2023).

iii. Engaging men as partners in gender equity

Achieving gender equity necessitates active involvement from men, addressing the needs of both genders to foster mutual trust within communities. This process helps to transform gender relations by promoting positive changes in attitudes, behaviours and practices (Chocholata, 2020).

POLICY AND PROGRAMMATIC RECOMMENDATIONS

Effective policy changes are needed to address structural inequalities in Nigeria's agriculture and improve women's roles in the agri-food value chain.

1. Strengthening gender-responsive budgeting - Gender-responsive budgeting (GRB) is essential for integrating programs that support smallholder farmers in Nigeria's budgets. Although women participate significantly in agriculture, Nigeria has a low global gender gap index ranking. The Federal Government allocates N68.55 billion for women's economic empowerment, but effectiveness is challenged by fragmented efforts across ministries and insufficient gender-disaggregated data (Oxfam, 2025).
2. Scaling up access to mechanization and inputs - The Women in Mechanized Agriculture Association (WIMA) has launched an agribusiness model that provides women-friendly agricultural equipment to female farmers, targeting one million women by 2030. Operating in 19 states with seven fully functional, WIMA has set up 24 mechanization hubs across Nigeria. Their services include tractors, harvesters, threshing, irrigation, and spraying, enabling women to participate fully in agriculture while managing their responsibilities as farmers, mothers, and wives (Women in Mechanized Agriculture Association [WIMA], 2024).
3. Institutionalizing gender audits in agri-programs - FMAFS should create a gender mainstreaming checklist for the Medium-Term Sector Strategy and budgets and engage small-scale women farmers in audit work to improve accountability through the dissemination of findings (The Nigerian Economic Summit Group [NESG], 2016).

CONCLUSION

Gender dynamics in the agri-food value chain in Nigeria highlight significant barriers faced by women. Inclusive policies are crucial for achieving gender equality and enhancing the sustainability of this sector. Stakeholders should acknowledge women's essential contributions to agriculture and implement empowering policies, leading to a more equitable agricultural landscape. Transformative measures focused on gender equity can significantly boost agricultural productivity and resilience, benefiting the entire economy.

REFERENCES

Abolade, D. A. (2021). Gender equality and sustainable development in Nigeria: Issues and challenges. *Trends Economics and Management, Brno University of Technology, Faculty of Business and Management, Brno,* 15, (37), 9-25. https://doi.org/10.13164/trends.2021.37.9

Chocholata, L. (2023). Farmer field schools, gender equality, social inclusion and community empowerment-Experiences from Senegal. Rome, FAO. https://doi.org/10.4060/cc4361en

Chocholata, L. (2020). Farmer field schools, gender equality, social inclusion and community empowerment – Experiences from Uganda - Karamoja sub-region, case study. Rome, FAO. https://doi.org/10.4060/cb0709en

Development Research and Projects Centre (2025). Gender responsive budgeting and federal government of Nigeria 2025 appropriation bill: A critical analysis of women economic empowerment budgetary provisions. Retrieved from https://drpcngr.org/wp-content/uploads

Feed the Futrure (2021). Nigeria agricultural extension and advisory services activity. Retrieved from https://eucord.org/wp-content/uploads/2021/02/FTF

Idris-Adeniyi, K. M., Busari, A. O. and Olawale, M. O. (2021). Gender disparities in access to credit among farming households in Iwo agricultural zone of Osun state, Nigeria. *Nigerian Journal of Rural Sociology*, 19 (2): 107- 111

Olanrewaju, K. O., Akintunde, O. K., Adeoye, I. B. and Bamiwuye, O.A. (2021). Gender differential in leafy vegetable production in Lagelu Local Government Area of Oyo State, Nigeria. *Journal of Agriculture and Food Sciences, 19 (1),* 120-133

Olonade, O. Y., Oyibode, B. O., Idowu, B. O., George, T. O., Iwelumor, O. S., Ozoya, M. I., Egharevba, M. E., & Adetunde, C. O. (2021). Understanding gender issues in

Nigeria: The imperative for sustainable development. *Heliyon*, 7(7), e07622. https://doi.org/10.1016/j.heliyon.2021.e07622

Oxfam (2024). Executive Summary: Synthesis Report on Gender Responsive Budgeting for Small-Scale Women farmers in the 2024 Budget of the Federal Government of Nigeria: Issues for Stakeholder Engagement towards Food Security and Poverty Eradication. https://nigeria.oxfam.org

Pyburn, R., Vanya Slavchevska, V. & Kruijssen, F. (2023). Gender dynamics in agrifood value chains: Advances in research and practice over the last decade. *Global Food Security*, 39 (100721). *https://doi.org/10.1016/j.gfs.2023.100721*

Research Supporting Africa (2022)- Gender and MSMEs in Nigeria's agri-food sector with a gender evaluation of the RSM2SNF Project. Department of Agricultural, Food, and Resource Economics, Michigan State University. Retrieved from https://www.canr.msu.edu/resources/

Suleiman, R., Olorukooba, M. M., Emeghara, U. U., Oladele, O. N., Yahaya, U. F., Olukotun, O. (2020). Vegetable marketing among retailers in Kaduna South Local Government Area of Kaduna State, Nigeria. The Nigerian Economic Summit Group (NESG) (2016). Revised draft national policy on gender in agriculture. https://nesgroup.org/download_

Women in Mechanized Agriculture Association (WIMA) (2024). Transforming agriculture through female empowerment and modern technology. https://wimanigeria.com/projects

USAGE OF NON-KINETIC APPROACHES FOR CONFLICT RESOLUTION BETWEEN FARMERS AND HERDERS IN OMALA LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA

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ABSTRACT
The study examined usage of non-kinetic approaches for conflict resolution between farmers and herders in Omala Local Government Area of Kogi State. Multistage sampling procedure was used to select 132 farmers and snowball sampling procedure used to select 32 pastoralists in the study area. Data were analysed using frequency, percentage, and mean. The results showed that 77.4% of farmers and 63.6% of pastoralists were male. The mean household of farmers and pastoralists were 16 and 7 people respectively. Traditional heads (100.0%), capacity building (96.8%) were the most non-kinetic approaches used for conflict resolution as reported by pastoralists. While farmers reported that use of traditional heads (86.4%) and open communication (81.8%) were the most non-kinetic approaches used for conflict resolution. Religious differences ($\bar{X}$ =2.82) and inadequate access to resources ($\bar{X}$ =2.86) were the severe constraints to non-kinetic approaches as reported by farmers. Also, religious differences ($\bar{X}$ =2.81) and cultural differences ($\bar{X}$ =2.61) were the severe constraints reported by the pastoralists. It is recommended that there should be religious and culture tolerance in order to restore peace. Traditional heads should foster trust between farmers and pastoralists. Lastly, cultural exchange should be promoted to restore peace in the study area.

Keywords: Usage of Non-Kinetic Approaches, Farmers and Herders, Peaceful, Coexistence

INTRODUCTION

Conflicts are inevitable in human life, organizations or even between nations. Omisore (2014) reported that conflicts occur as a result of competition for supremacy, leadership style, and scarcity of common resources, envy and jealousy. Conflict between farmers and herders can hinder cooperation, disrupt productivity, and create an atmosphere of hostility and mistrust. The unprecedented effect of conflict between farmers and herders has resulted to low productivity thereby contributed to the problem of food insecurity (Omaku *et al*., 2023). Conflict have been reported in various parts of the North Central geopolitical zone of the country, including Kogi State, where it has resulted in the displacement of communities and the disruption of social and economic activities despite the efforts of the government at various levels to arrest this situation (Fidelis and Abraham, 2023). Measures such as establishment of colony, avoidance of cattle routes, and other effective measures have been counter-productive. Non kinetic approaches are one the lasting solution to incessant farmers and herders conflict. Non-kinetic approaches to conflict resolution refer to strategies and methods that do not involve the use of physical force or violence. Some examples of non-kinetic approaches to conflict resolution include: Diplomacy and negotiation, mediation and facilitation, dialogue and communication, conflict transformation and capacity-building/training. The objectives of this study are to: describe the socio-economic characteristics of the respondents in the study area; identify the types non-kinetic approaches to conflict resolution in the study area; and examine the constraints associated with usage of non-kinetic approaches in conflict resolution.

METHODOLOGY

The study was done in Kogi State. The State has latitudes of 6º33' and 8º 44'N and longitude 5º 22' and 7º 49' E. The State has a population of approximately 5,053,734 people as of 2023 and about 2 million hectares of land (National Bureau of Statistics, 2023). The availability of vast land in the State eases the cultivation of arable crops and livestock production. A three-stage sampling procedure was used for this study. The first stage involved purposive selection of Omala Local Government Area this is due to reoccurrence farmers and pastoralists' conflicts that have resulted to severe loss of life and properties. The second stage involved random selection of 6 communities in the LGA. The third stage involved proportional selection of 10% from the sample population to give a total of 132 farmers. For the pastoralists, the Snowball sampling method was used through the help of their umbrella body Miyetti Allah Cattle Breeders Association of Nigeria (MACBAN). The leadership assisted the researcher to select one pastoralist that assist in locating other pastoralists due to their nature of settlement (*Rugage*). A total of thirty one (31) was sample for the study. Primary was employed for this study. The study objectives were achieved using frequency, percentages and mean. Constraints associated with non-kinetic approaches was measured using 3 points Likert type of very severe=3, severe=2, not severe=1. These were added together to get 3+2+1=6 and was divided by 3 to get a mean score of 2.0 which served as the

mean point. Any point less than 2.0 was regarded as not severe while above 2.0 was regarded as severe.

RESULTS AND DISCUSSION

The result in Table 1 indicated that 63.6 percent of the farmers were male. On the other hand, Table 1 revealed that 77.4% of the pastoralists were male. This finding revealed that most of the respondents were male. Table 1 showed that the mean household size of pastoralists and farmers was 16 and 7 people respectively. This implies large household size. This might serve as a source of labour for herding and farming activities and also influence the decision to use non-kinetic approaches for conflict resolution. Table 1 revealed that the mean age of pastoralists and farmers were 45 years and 42 years respectively. This implies that respondents were still active and productive, strong, energetic, and full of innovative ideas. This finding agreed with Umar *et al.* (2021) who stated that majority of the farmers in Niger State were within the youthful age group. Table 1 showed that the mean experience of herders was 25.6 years, while that of farmers was 14.7 years.

Table 1: Socio-economic characteristics of farmers and pastoralists

Variables	Farmers (n=132)			Pastoralists (n=31)		
	Freq	Percentage	Mean	Freq	Percentage	Mean
Sex						
Male	84	63.6		24	77.4	
Female	48	36.4		7	22.6	
Household size						
1-5	60	45.5		4	12.9	
6-10	60	45.5		5	16.1	
11-15	1	0.8	7	8	25.8	16
>15	11	8.3		14	45.2	
Age						
<30	22	16.7		4	12.9	
31-40	45	34.1		9	29.0	
41-50	28	21.2	42	5	16.1	45
>50	37	28.0		13	41.9	
Farming experience						
1-10	66	50.0		3	9.7	
11-20	35	26.5	14.7	11	35.5	25.6
>20	31	23.5		17	54.8	

Sources: Field survey, 2024

Non-kinetic approaches used for Conflict Resolution between Farmers and Pastoralists

Table 2 shows that traditional heads (100.0%), capacity building (96.8%), negotiation (83.9%), cultural exchange (64.5%), and mediation (64.5%) were the non-kinetic approaches used to conflict resolution as reported by pastoralists. On the other hand, farmers reported that use of traditional heads (86.4%), open communication (81.8%), negotiation (77.3%), and use of third parties were the most non-kinetic approaches accessed. The traditional heads of both parties have played active roles in restoring peace. Farmers and pastoralists are often loyal and committed leaders and are always ready to make way for peace.

Table 2: Non kinetic approaches to conflict resolution

Variables	Farmers (n=132)		Pastoralists (n=31)	
	Freq	Percentage	Freq	Percentage
Use of capacity building mechanism	72	54.6	30	96.8
Mediation	72	54.6	20	64.5
Open communication	108	81.8	6	19.4
Negotiation	102	77.3	26	83.9
Joint planning of resources	60	45.5	15	48.4
Arbitration	66	50.0	16	51.6
Cultural exchange	60	45.5	20	64.5
Early warning system	78	59.1	15	48.4
Training on conflict resolution	60	45.5	18	58.1
Use of traditional heads	114	86.4	31	100.0

Sources: Field survey, 2024

Constraints associated with usage of non-kinetic approaches

Table 3 revealed that religious differences ($\bar{X}$ =2.82), inadequate access to resources ($\bar{X}$ =2.86), mistrust between parties ($\bar{X}$ =2.23), political interest ($\bar{X}$ =2.23), cultural differences ($\bar{X}$ =2.18), and historical grievances were the severe constraints to non-kinetic approaches as reported by farmers. The pastoralists reported that religious differences (2.81), cultural differences ($\bar{X}$ =2.61), mistrust between parties ($\bar{X}$ =2.54), economic interest ($\bar{X}$ =2.32), political interest ($\bar{X}$ =2.23), and power imbalance were the severe constraints reported by the pastoralists in the study area.

Table 3: Constraints associated with Usage of Non-Kinetic Approaches

Variables	Farmers				Pastoralists			
	Very severe	Severe	Not severe	Mean	Very severe	Severe	Not severe	Mean
Mistrust	66(50.0)	30(22.7)	36(27.3)	2.23	22(70.9)	4(12.9)	5(16.1)	2.54
Power imbalance	24 (18.2)	12(9.1)	96(72.7)	1.45	9(29.0)	17(54.8)	5(16.1)	2.12
Political interest	36(27.3)	90(68.2)	6(4.6)	2.23	18(58.1)	2(6.5)	11(35.5)	2.23
Economic interest	6(4.6)	12(9.1)	114(86.4)	1.09	16(51.6)	9(29.0)	6(19.4)	2.32
Cultural differences	36(27.3)	84(63.6	12 (9.1)	2.18	26(83.8)	1(3.2)	4(12.9)	2.61
Historical grievances	36(27.3)	72(54.6)	24(18.2)	2.09	23(74.2)	3(9.7)	5(16.1)	2.58
Limited technical expertise	6(4.9)	6(4.9)	120(90.9)	1.14	2(6.5)	8(25.8)	21(67.7)	1.39
Religious differences	120(90.9)	0(0)	12(9.1)	2.82	28(90.3)	0(0)	3(9.7)	2.81

Sources: Field survey, 2024

CONCLUSION

It can be concluded that most of farmers and pastoralists were male with large household size, young with many years of experience in farming and herding. The most causes of conflict were stealing of crops/cattle, attacks on crops or cattle and overgrazing. Traditional heads, capacity building and negotiation were the most non-kinetic approaches to conflict use in the study area. The most constraint associated with usage of non-kinetic approaches includes religious difference, inadequate access to resources and mistrust between both parties. It is recommended that farmers and pastoralists should be supported with resources in order to reduce competition for scarce resources. There should be religious and culture tolerance in order to restore peace. Traditional heads should foster trust between farmers and pastoralists.

REFERENCES

Fidelis, A. and Abraham, M. A. (2023). "Farmers and Herders Conflict: The Case of Omala Local Government Area. *Wukari International Studies Journal*, 7 (3), 21-26.

National Bureau of Statistics (NBS) (2023). Population by State and Sex. https://en.m.wikipedia.org/wiki/List_of_Nigerian_states_by_population.

Omisore, B. and Abiodun, A. R. (2014). Organizational Conflicts: Causes, Effects and Remedies. *International Journal of Academic Research in Economics and Management Sciences*, (6) 13-18

Omaku, M. I., Salisu, O. U., Yakubu, S., Abubakar, U. A., Yisah, L. J. and Aliyu, K. A. (2023). Analysis of Farmers and Pastoralists Willingness to use Alternative Dispute Resolution (ADR) Strategies in Conflict Resolution in Nasarawa State, Nigeria, A *Proceedings of 57th Annual Conference of Agricultural Society of Nigeria (ASN)(ASN)* held at Landmark University, Federal University Lafia, Nasarawa State. Pp 1070-1074.

Omaku, M. I., Umar, I. S., Olaleye, R.S., Tsado J. H., and Pelemo, J. J. (2021). Effectiveness of Alternative Dispute Resolution Strategies in Improving Farmers-Pastoralists Relationship in Nasarawa and Niger States, Nigeria, *International Journal of Agriculture and Rural Development*, 24 (1), 5569-5574.

CONSTRAINTS TO THE ADOPTION OF FARO 44 AND FARO 55 IMPROVED RICE VARIETIES IN NIGER STATE, NIGERIA

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ABSTRACT
The study examined constraints to the adoption of Faro 44 and Faro 55 improved rice varieties in Niger State, Nigeria. Three stage sampling procedure was used to select 285 rice farmers. Data were collected from primary source using structured questionnaire complemented with interview schedule. Data collected were analysed using descriptive statistics such as (means, percentages and frequency distribution) and Kendall Coefficiencient of Concodance. The results show that 81.8% of rice farmers were male with mean age of 42.8 years. Improved standard of living ($\bar{X}$ =2.78) and increase in income ($\bar{X}$ =2.73) were the most perceived effects of adoption of FARO 44 and FARO 55 improved rice varieties. Poor road network ($\bar{X}$ =5.54) and inadequate improved varieties ($\bar{X}$ =5.59) were the most constraints to the adoption Faro44 and Faro55 improved rice varieties. It is recommended that feeder roads should be constructed by State and LGAs authority in order to ease the movement of farmers produce from farms to point of processing.
Keywords: Faro44, Faro55, Rice varieties

INTRODUCTION

Rice (*Oryza sativa*) is one of the most cultivated crops in the world. It is third most important cereal grown and consumed globally after wheat and maize (Agro Nigeria, 2018). Rice is cultivated in almost all ecological belt of the country as they all provide favourable environments to support the crop cultivation (Agro Nigeria, 2018). During the past three decades, the demand for rice has increased steadily, playing a major role in the strategic food security planning policies of many countries in sub-Saharan Africa (WARDA, 2011). However, several research findings have pointed out that the use of new agricultural technology, such as high yielding rice varieties that kick started the green revolution in Asia. Many improved rice varieties exist that can be grown in Nigeria, National Cereal Research Institute (NCRI) Baddegi had released many improved rice varieties for cultivation suitable to different agro-climatic condition which includes; early maturity varieties, medium maturity varieties, late maturity, deep water (floating) area. FARO 44 and FARO 55 are few of the most highly adopted compared to other developed varieties (Adesina, 2012). In the past decades' government has committed considerable resources to agricultural research towards developing high yielding rice varieties. Despite the favourable climate, good plain soil condition, developed improved rice varieties and high level of transfer of this technology to the rural households through extension agents, the adoption rate is still very low translating into extremely low productivity of rice and other constraints. The main aim of the study is to examine constraints to the adoption of Faro 44 and Faro 55 improved rice varieties in Niger State, Nigeria. The specific objectives are to: describe the socioeconomic characteristics of rice farmers in the study area; determine the perceived effects of adoption of FARO 44 and FARO 55 and examine the constraints to the adoption Faro44 and Faro55 improved rice varieties.

METHODOLOGY

The study was conducted in Niger State. The State can be found in the Guinea Savannah ecological zone of Nigeria. It is located within longitude 3° 30' and 7° 20' East & latitude 8° 20' and 11° 30' North, with a population of about 3,950,249 (NPC, 2006) and with a growth rate of 3.2%, the State an estimated population of 5,586,000 in 2017 (Niger State Geographical Information System, 2015). Rice is one of the most produced staple crop in Niger State. Three-stage sampling technique was employed in this study to select the sample size. The first stage involved random selection of two local Government Areas (LGAs) from these zones. The second stage involved random selection of three (3) villages from each LGA in selected State making a total of eighteen (18) villages. The fourth stage involved the use of proportional sampling to select 10% of the respondents from the sampling frame to give a total of 285 rice farmers. Primary data was used for this study. Data was collected by researchers assisted by trained enumerators using questionnaire and complimented with interview schedules.

Objectives I and II were achieved using descriptive statistics (frequency, percentages and mean).

Kendall's coefficient of concordance

To examine the constraint associated with FARO 44 and FARO 55. Kendall's coefficient of concordance (W) described by Mattson was employed to rank the problems. A lower mean rank indicates the problem is not severe and vice versa. It is mathematically expressed as:

$$W = \frac{12\sum R^{-2}\, i - 3N(N-1)^2}{N(N-1)} \quad \ldots\ldots \quad (1)$$

Where;
W = Kendell's value, N= Total sample size,
R = Mean of the rank =ith term
R=mean of the rank. The kendall's coefficient of concordance (W) is a measure of the extent of agreement or disagreement among farmers of the ranking obtained. The value of W is positive and ranges from zero to one where one denotes perfect agreement among farmers of the rankings and zero denotes maximum disagreement.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Result in Table 1 showed mean ages of rice farmers 42.8 years. This is an indication that rice farmers in the study area still within the active productive ages. This finding is also consistent with the findings of Tsado *et al*. (2018), who found that majority of rice farmers in Niger State, Nigeria were young farmers are in their active ages. Table 1 indicated that 81.6% of rice farmers were males. This result implies that majority of rice farmers in the study area were males. Table 1 indicated that the mean household size of rice farmers was 10 persons. This implies large household size. Result in Table 1 revealed the mean years of experience of rice producers was 27.2 years. This shows that rice farmers in the study area had high experience in rice production.

Table1: Distribution of rice farmers according to socio-economic characteristics (n=285)

Variables	Frequency	Percentage	Mean
Age			
≤30	52	18.3	42.8
31-40	73	25.6	
41-50	98	34.4	
>50	62	21.8	
Sex			
Male	233	81.8	
Female	52	18.2	
Household size (number)			
1-5	62	21.8	10
6-10	133	46.7	
11-15	57	20.0	
>15	33	11.6	
Experience in Farming (year)			
1-10	28	9.8	27.2
11-20	64	22.6	
21-30	88	30.9	
>30	105	36.8	

Sources: Field survey, (2019)

Perceived effects of adoption of improved rice varieties on farmers' livelihood

Table 2 showed that improved standard of living ($\bar{X}$ =2.78), increase in income ($\bar{X}$ =2.73), Moreover, procurement of household assets ($\bar{X}$ =2.72) and employment opportunity ($\bar{X}$ =2.66) were the perceived effects of improved rice varieties on rice farmers' livelihood status. This shows that rice varieties are capable of improved standard of living and increasing the income of rice producers in the study area.

Table 2: Perceived effect of adoption of improved rice varieties on rice farmers' livelihood (n=285)

Variables	Mean ($\bar{x}$)	Ranking	Decision
Improved standard of leaving	2.78	1st	High
Increased income	2.73	2nd	High
Procurement of household assets	2.72	3rd	High
Employment opportunities	2.66	4th	High
Enhance food security	2.65	5th	High
Acqusition of productive assets	2.59	6th	High
Provision of shelter	2.49	7th	High
Settlement of children school fees	2.10	8th	High
Assist in procurement of means of transportation	1.92	9th	Low

Sources: Field survey, 2019

Constraints to the adoption of improved rice varieties

Table 3 showed that Kendall's coefficient of concordance obtained in the analysis was 31.0% level of probability. The result showed a weak agreement. The results showed that poor road network ($\bar{X}$ =5.54), inadequate improved varieties ($\bar{X}$ =5.59), inadequate output ($\bar{X}$ =5.72), inadequate input ($\bar{X}$ =6.03) ranked, inadequate extension ($\bar{X}$ =7.17) were the major constraints to the adoption of improved rice varieties. This agreed with Mohammed *et al*. (2019), who reported that poor road network, inadequate output and inadequate improved varieties were one of the challenges to Adoption of Faro (39) Rice Project Technology by Farmers' in Agricultural Zone 1 of Niger State, Nigeria.

Table 3: Constraints to the adoption of improved rice varieties (n=285)

Variables	Mean ($\bar{x}$)	Ranking
Poor road network	5.22	1st
Inadequate improved varieties	5.42	2nd
Inadequate output	5.65	3rd
Inadequate input	5.80	4th
Inadequate extension services	7.11	5th
Land tenure problem	7.25	6th
Loan and financial acquisition problem	7.39	7th
Processing problem	7.43	8th
Kendall's W	0.13	
Chi-Squared	430.503	
Degree	7	
Asymptotic significant	0.000***	

Sources: Field survey, 2019

CONCLUSION AND RECOMMENDATIONS

It can be concluded that majority of rice farmers were in their active age with many years of experience. Improved standard of living and increase in income were the most perceived effects of adoption of FARO 44 and FARO 55 improved rice varieties. Poor road network and inadequate improved varieties were the most constraints to the adoption Faro44 and Faro55 improved rice varieties. It is recommended that feeder roads should be constructed by State and LGAs authority in order to ease the movement of farmers produce from farms to point of processing. Also, research institutes should ensure farmers access improved rice varieties with affordable prices and at the right time.

REFERENCES

Adesina, B. A. (2012). Analysis of Economics Efficiency of improved Rice varieties utilisation: A Parametric Frontier Approach. *Journal of Economics* 2(2), 18-21.

Alhassan, I. L., Umar, I.S., Mohammed, U., Usman, N. S., Abubakar, M. B., and Pelemo J.J (2019) Farmers Perception of the Effects of Climate Change on Rice Production in Niger State, Nigeria, *Proceedings of 53rd Annual Conference of Agricultural Society of Nigeria (ASN)* held at National Cereal Research Institute Baddegi, 21st-25th October 2019, 82-89.

Rice Cultivar FARO 44: Improving Rice Productivity in Nigeria Http://agronigeria.com.ng/ngrice-cultivar-faro-44-improving-rice-productivity-in-nigeria acccessed 14th, March, 2018.

National population commission (NPC), (2006).Year book on Nigeria population data. Report of the NPC. Retrieved from http://www.jstor.org. Retrieved on 02/02/17.

Niger State Geographic Information System (2015). Background information. Retrieved from www.nigergis.com/about_niger_state. Retrieved on 04/04/17.

Tsado, J. H., Ajayi, O.J., Tyabo, I.S., Pelemo, J. J,. & Adebayo, E. (2018). Socio economicanalysis of rice farmers uptake of imroved seeds for enhanced well-being in Wushishi community In Niger State, Nigeria. Paper presented at 27th Annual Conference of Rural Sociology Society of Nigeria (RUSAN) held at Ahmadu Bello University Zaria, 7th-11th October.

ASSESSMENT OF "MAIZE FARM ASSISTANT" DIGITAL INNOVATION AMONG AGRICULTURAL EXTENSION WORKERS IN SOUTH-WEST, NIGERIA

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ABSTRACT
The study assessed "Maize Farm Assistant" (MFA) digital innovation among Agricultural Extension workers in South-west, Nigeria. Purposive sampling technique was used to select 125 respondents for the study based on their possession of Android mobile devices required for the digital innovation. Structured questionnaire was used to collect primary data on the cost, complexity, accessibility, relative advantage, trial ability, compatibility, and adoption stage of MFA digital innovation. Data were analysed using frequency counts, percentages, mean, and correlation. Results show that all (100%) of the respondents perceived the innovation to be affordable in cost, while 53.6% perceived it to be easy to use. Slightly more than half (52.8%) and only 32.0% perceived it to be moderately accessible and very accessible, respectively, while 45.6% perceived it to have moderate relative advantage. About two-third (65.6%) perceived it to be triable, while 62.4% perceived it to be compatible with their mobile device. In terms of the stage of adoption, 9.6%, 11.2%, 5.6%, 12.8%, and 60.8% of the respondents were at the awareness, interest, evaluation, trial, and adoption stages, respectively. There was significant relationship between the accessibility ($r = 0.244$, $p<0.05$) of MFA and its adoption among the respondents. The study concluded that majority of the Agricultural Extension workers favourably perceived the cost, trial ability and compatibility of MFA. Furthermore, the accessibility of MFA significantly influenced its adoption. It is recommended that software developers and other stakeholders should direct greater attention towards improving the accessibility of digital innovations to enhance their adoption.
Keywords: Digital Innovation, Maize Farm Assistant, Mobile application, Agricultural Extension, Digitalization.

INTRODUCTION

Digital innovations such as mobile applications and web applications that were developed with specific focus on agriculture have great potential to help extension workers in reaching more farmers or farm households, and in performing their duties more efficiently. According to U.S. Agency for International Development [USAID] (2018) cited in Nikola, Samuel and Meng (2019), digital technologies open up new avenues for integrating smallholders into a technology-driven agri-food system. Furthermore, as stated in Food and Agriculture Organization of the United Nations (FAO) (2021), digital innovations create new opportunities for agricultural extension and advisory services, enhance farmers' access to guidance in remote areas, close information gaps among value chain actors, and promote inclusive markets and fair trade. Furthermore, such digital innovations facilitate the delivery of timely and accurate agricultural information and other advisory services to farmers.

A key example of digital innovation that aids agricultural extension agents in providing advisory services to maize farmers is "Maize Farm Assistant". The "Maize Farm Assistant" is an Android mobile application that provides digital agricultural extension supports which can help maize farmers to achieve better yield, improve their productivity, and enhance their income from maize production (Ajireloja, 2023). The "Maize Farm Assistant" is available on Google Play Store.

It is essential to state that agricultural extension workers act as intermediaries or links between farmers and research institutions, facilitating transfer of knowledge, innovations, and best practices that can lead to increased productivity and sustainable agricultural development. However, majority of farmers could not be reached due to shortage in the number of the extension workers in South-West Nigeria. This problem has been as a result of the wide extension to farmer ratio (1:5,000-10,000) (Davis, Lion and Arokoyo, 2019). This situation calls for the agricultural extension workers to embrace the use of digital solutions. Furthermore, for extension workers to be able to effectively train farmers on how to maximise the available digital innovations, they are expected to have adopted them and gotten themselves familiar with their usage and benefits.

Despite the number of research studies that have been conducted in the past, there is still scarcity of research works that focus specifically on the assessment of "Maize Farm Assistant" (MFA) digital innovation among agricultural extension workers in South-West, Nigeria. This study was therefore conducted to fill the research gap. The specific objectives of the study were to examine the cost, complexity, accessibility, relative advantage, trial ability and compatibility of "Maize Farm Assistant" digital innovation; and to investigate the adoption stage of "Maize Farm Assistant" digital innovation among the respondents. The hypothesis tested was: Ho1- There is no significant relationship between the perceived characteristics (complexity,

accessibility, relative advantage, trial ability and compatibility) of "Maize Farm Assistant" digital innovation and its adoption among the respondents.

METHODOLOGY

This study was carried out in the south-western part of Nigeria. Purposive sampling technique was used to select 125 agricultural extension workers (52 from Osun State and 73 from Ogun State) as respondents for the study based on their possession of Android mobile devices required for the digital innovation. Structured questionnaire was used to collect primary data on the cost, complexity, accessibility, relative advantage, trial ability, compatibility, and adoption stage of "Maize Farm Assistant" digital innovation. Data were analysed using frequency counts, percentages, mean, and Spearman's correlation.

RESULTS AND DISCUSSION

Perceived innovation characteristics

The cost, complexity, accessibility, relative advantage, trial ability and compatibility of "Maize Farm Assistant" (MFA) digital innovation were explored as perceived among the respondents and the results of the analyses are shown in Table 1 and Table 2. In terms of cost, all (100%) of the respondents perceived the digital innovation to be affordable. This indicates that MFA require no or very little financial commitment before it could be fully accessed and used by the agricultural extension workers. As opined by Olagunju *et al*. (2021), investment in digital tools that are low-cost and aimed at providing farmers with needed information and market connections can help to tackle some of the new agricultural challenges. In terms of complexity, more than half (53.6%) of the respondents perceived the MFA to be easy.

Table 1: Distribution of the respondents according to their perceived cost, complexity and accessibility of "Maize Farm Assistant" digital innovation (n= 125)

Variables	Frequency	Percentage (%)
Cost		
Affordable	125	100.0
High and not affordable	0	0.0
Complexity		
Very Complex	0	0.0
Slightly Complex	25	20.0
Easy	67	53.6
I don't know	33	26.4
Accessibility		
Very Accessible	40	32.0
Moderately Accessible	66	52.8
Sometimes Accessible	17	13.6
Not Accessible	2	1.6

Source: Field survey, 2024.

Table 2: Distribution of the respondents according to their perceived relative advantage, trial ability and compatibility of "Maize Farm Assistant" digital innovation (n= 125)

Variables	Frequency	Percentage (%)
Relative Advantage		
High Advantage	19	15.2
Moderate Advantage	57	45.6
Little Advantage	14	11.2
No Advantage	2	1.6
I don't know	33	26.4
Trial ability		
Very Triable	82	65.2
Slightly Triable	10	8.0
Not Triable	0	0.0
I don't know	33	26.4
Compatibility		
Very Compatible	78	62.4
Slightly Compatible	13	10.4
Not Compatible	1	0.8
I don't know	33	26.4

Source: Field survey, 2024.

The results indicate that the complexity of the innovation was very low, as most of the respondents that have tried it found it to be easy to use. In terms of accessibility, 52.8% of the respondents perceived the MFA to be moderately accessible. This indicates that the innovation responds at most of the time that more than half of the agricultural extension workers needed to use it. This finding agrees with Sa'adu *et al*. (2022) who found out that majority of agricultural extension agents had moderate level of accessibility to Information and Communication Technology (ICT). In terms of relative advantage, 45.6% and 15.2% of the respondents perceived the innovation to have moderate advantage and high advantage respectively compared to the conventional advisory services channels. In terms of trial ability, almost two-third (65.2%) of the respondents perceived it to be very triable. In terms of compatibility, majority (62.4%) perceived it to be very compatible. This implies that majority of the Agricultural Extension Agents were able to use the features of the innovation on their Android mobile devices.

Stage of adoption of the digital innovation

Figure 1 shows that majority of the respondents (60.8%) had already adopted the "Maize Farm Assistant" digital innovation. Also, 9.6%, 11.2%, 5.6% and 12.8% were at the awareness, interest, evaluation and trial stages respectively. This demonstrates readiness among extension workers to embrace digital transformation in agricultural advisory services. However, the remaining 39.2% who are still at the earlier stages suggest that adoption efforts are ongoing and require continuous support.

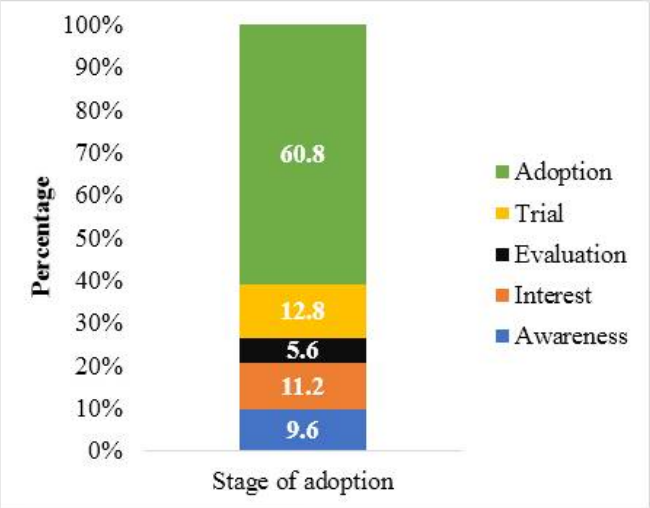

Figure 1: Distribution of the respondents according to their stage of adoption of "Maize Farm Assistant" (n=125).
Source: Field survey, 2024.

Hypothesis testing

Table 3 shows that at p<0.01, there was a significant (r = 0.244) relationship between the accessibility of Maize Farm Assistant digital innovation and its adoption among the respondents. This implies that among all the innovation characteristics considered in this study, only accessibility significantly influenced the progression of the agricultural extension workers to the adoption stage.

Table 3: Result of Spearman's rho correlation analysis showing the relationship between the perceived characteristics of the MFA digital innovation and its adoption among the respondents

Characteristics	r-value	p-value	Decision
Complexity	0.022	0.832	NS
Accessibility	0.244**	0.006	S
Relative Advantage	0.132	0.209	NS
Trial ability	0.116	0.270	NS
Compatibility	0.042	0.688	NS

** Significant at p<0.01 S= Significant NS= Not Significant
Source: Field survey, 2024.

CONCLUSION AND RECOMMENDATION

The study concluded that the agricultural extension workers generally perceived the "Maize Farm Assistant" digital innovation as affordable,

less complex, highly accessible, possessing moderate relative advantage, highly triable and largely compatible with their Android mobile devices. In terms of adoption, majority of the respondents had progressed to the adoption stage, with fewer at the earlier stages such as awareness, interest, evaluation and trial. Among the innovation characteristics examined, only accessibility had a statistically significant relationship with the stage of adoption.

It is recommended that software developers and other stakeholders should direct more attention towards improving the accessibility of digital innovations to enhance their successful adoption.

REFERENCES

Ajireloja, J. (2023). *Maize Farm Assistant* (Version 2.0) [Mobile app]. Google Play Store. Available at: https://play.google.com/store/apps/details?id=com.ajirelab.maizefarmassistant

Davis, K. E., Lion, K. and Arokoyo, T. (2019). Organizational capacities and management of agricultural extension services in Nigeria: Current status. *South African Journal of Agricultural Extension*. 47(2):118-127.

Food and Agriculture Organization of the United Nations (FAO). (2021). Empowering smallholder farmers to access digital agricultural extension and advisory services. Available at: https://www.fao.org/3/cb5944en/cb5944en.pdf

Nikola M. T., Samuel V., and Meng Z. (2019). Digital Technologies in Agriculture and Rural Areas Briefing Paper. Food and Agriculture Organization of the United Nations, Rome.

Olagunju, O., Adetarami, O., Koledoye, G. F., Olumoyegun, A. T. and Nabara, I. S. (2021). Digitization of Agricultural Extension System for Effective Management of Emergency in Nigeria. *Journal of Agricultural Extension*, 25(4):81-91. DOI: https://dx.doi.org/10.4314/jae.v25i4.9

Sa'adu, M., Man, N., Kamarulzaman, N. H., Shah, J. A., and Tafida, A. A. (2022). Factors Affecting use of Information Communication Technologies among Extension Agents in North-East, Nigeria. *Journal of Agricultural Extension*, 26(1): 36–43. Available at https://aesonnigeria.org/ajm/index.php/jae/article/view/3002

U.S. Agency for International Development (USAID). (2018). Digital farmer profile: Reimagining Smallholder Agriculture. Washington D.C.: USAID.

ANALYSIS OF POST-HARVEST MANAGEMENT TRAINING RECEIVED BY YAM FARMERS IN NIGER STATE OF NIGERIA

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ABSTRACT

The study analysed post-harvest management training received by yam farmers in Niger State, Nigeria. Three stage sampling procedure was used to select 180 yam farmers. Structured questionnaire complimented with interview schedule was used for data collection. Data was analysed using descriptive statistics (frequency, percentage, and mean). The result shows that other farmers (76.7%) and farm forum (72.2%) were the most sources of training on post-harvest management. Training on pests control in yam 86.7% and methods of yam preservation (77.7%) were the most training received by yam farmers. Quick deterioration of crops ($\bar{X}$=7.61) and inadequate credit facilities ($\bar{X}$=8.34) were most constraints associated with post-harvest management in yam. It is recommended that farmers should source for funds and credit from non-formal sources in order to purchase post-harvest tools that are needed to enhance the longevity of agricultural produce.

Keywords: Post-harvest management, Training received, Yam farmers

INTRODUCTION

Yam is one of the major sources of energy to large number of households in Nigeria. Yam provides 40% of caloric required by African (Aniedu, 2016). Yam is widely grown in the tropics due to the weather and climatic condition that favoured high production. Yam is an important item in the bride price in traditional marriage contracts among many tribes in Nigeria. Yam tubers can be eaten boiled, roasted, fried or pounded and could be chipped, dried and processed into yam flour for the preparation of "Amala" (Usongo *et al.,* 2014). Yam production is constrained majorly by high cost of seed yam, high cost of labour in land preparation, staking materials, inadequate and high cost of agrochemicals which has increased the cost of production (Ewuziem *et al.,* 2015). The nature of yams has made it susceptible to pests and diseases infestation thereby reducing the shelf life of the crop. Farmers in Nigeria are faced with serious challenge of keeping yam tuber for a long time due quick deterioration of the crop. Efforts to reduce post-harvest losses in yam have not yielded much result. It is believed that access to training by tam growers will reduce the challenges facing yam farmers. The objectives of the study are to: identify sources of training on post-harvest management in yam, examine the post-harvest training received in yam and identify the constraints associated with post-harvest management in yam.

METHODOLOGY

The study was conducted in Niger State. Niger state is located in the Guinea Savannah ecological zone of Nigeria, the state has the longest land mass among the states in Nigeria with total land area of 76,364 km^2 accounting for about eight percent of Nigeria land areas. About 95% are good for arable land production of staple crops like rice, cassava, and guinea corn. The state lies between Longitude 3^o 30' and 7^o 20' East & Latitude 8^o 20' and 11^o 30' North, with a population of about 3,950,249 (National Population Commission) NPC 2006 with a growth rate of 3.9%. The State has an estimated population of 6,374,000 in 2018 (Niger State Geographical Information System (NSGIS), 2018). Three-stage sampling procedure was employed for this study. The first stage involved selection of all the three (3) Agricultural zones of the State. The second stage involved random selection of one (1) Local Government Areas from each of the zone.The third stage involved random selection of four (4) communities each from the selected LGAs. The fourth stage involved the use of proportional sampling to select 10% of the respondents making a total of 180 sample size. Primary was employed for this study. The study objective i and ii were achieved using descriptive statistics (frequency, percentages and mean).

Kendall's Coefficient of Concordance

This was used to examine the constraints associated with post-harvest management in yam objective iii, the Kendall's coefficient of concordance (*W*) adopted from Mohammed *et al.* (2018) was used to rank the problems. The mean value is ranked from highest to lowest which indicate level of severity mean rank indicates the problem is severe and vice versa. The Kendall's W is modeled to output a coefficient which ranges from 0-1, whereas 0 means no absolute agreement, a random response among raters, 1 means absolute agreement (unanimity) among raters and

intermediates between the two (0 and1) indicate the degree of greater or lesser agreement (unanimity) among the responses. The Kendall's W was computed as shown below.

$W = \frac{12S}{p^2(n^3 - n) - pT}$; $0 \leq w \leq 1$ ……(1)

Where:

S - is the sum of squared deviations for each constraint and is given as:

$s = \sum_{i=1}^{n}(R_i - \bar{R})^2$ …… (2)

R i=total rank for the i the constraints, P= number of respondent (raters),

n=number of constraints to be ranked, T= correction factor for ties

RESULTS AND DISCUSSION

Sources of training on post-harvest management in yam

Table 1 showed that other farmers (76.7%) and farm forum (72.2%) were the major sources of training available to farmers. This implies training received from fellow farmers and farm forum were very important in the study area. This finding agrees with Elemosho *et al.* (2017) who reported that other farmers were the major sources of awareness on post-harvest management in River State, Nigeria. Other sources of training include community meeting (37.8%), friends (35.6%) and extension (35.6%).

Table 1: Sources of training on post-harvest management in yam (n=180)

Sources of training	Freq (%)	Rank
Other farmers	138 (76.7)	1th
Farm forum	130 (72.2)	2nd
Community meeting	68 (37.8)	3rd
Friends	64 (35.6)	4th
Extension officers	64 (35.6)	4th
Mass media	55 (30.6)	6th
ADP	30 (16.7)	7th
Ministry of agriculture	29 (16.1)	8th
Parents	22 (12.2)	9th
Field days	20 (11.1)	10th

Sources: Field survey, 2018

*Multiple responses

Post-harvest training received by yam farmers

Table 2 revealed that 86.7% of the respondents received training on pest control while 84.4% received training on sorting ill-healthy yam from healthy ones. This shows that training on pest control and sorting was the most received by yam farmers. Other trainings received by yam farmers include training on methods of yam preservation (77.7%), training on disease control (70.6%) and training on personal hygiene (66.7%). This finding agrees with Pelemo *et al.* (2024) who reported that majority of maize farmers in Kogi State received training on sorting.

Table 2: Distribution of the farmers according to post-harvest training received by yam farmers (n=180)

Types of training received in yam	Frequency	Percentage	Ranking
Training on pests control in yam	156	86.7	1st
Training on sorting ill-healthy yam from healthy ones	152	84.4	2nd
Training on methods of yam preservation	140	77.7	3rd
Training on diseases control in yam	127	70.6	4th
Training on personal hygiene in yam	120	66.7	5th
Training on methods of yam packing	88	48.9	6th
Training on yam methods of yam processing	85	47.2	7th

Sources: Field survey, 2018

Constraints associated with post- harvest management in yam

Table 3 indicated that inadequate credit facilities ($\bar{X}$ =8.34) and shortage of funds ($\bar{X}$ =8.35) were the most constraints associated with yam farmers in Niger State. Other constraints were high cost of post-harvest materials ($\bar{X}$ =8.37), unfavorable price due to low income ($\bar{X}$ =9.14) and loss in market value ($\bar{X}$ =9.41). This finding agrees with that of Pelemo *et al.* (2024) that reported inadequate credit and shortage of funds are major constraints affecting maize farmers in Kogi State

Table 3 Distribution according to constraints associated withpost-harvest management (n=180)

Variables	Mean ($\bar{x}$)	Ranking
Inadequate credit facilities	8.34	1st
Shortage of funds	8.35	2nd
High cost of post-harvest materials	8.37	3rd
Unfavourable price due to low income	9.14	4th
Loss in market value	9.41	5th
Lack of farmers participations	9.54	6th
Insect attacks	9.60	7th
Inadequate market information	9.96	8th
Disease attack	9.98	9th
Kendall's W	0.98	
Chi-Squared	318.564	
Degree	10	
Asymptotic significant	0.000***	

Sources: Field survey, 2018

CONCLUSION AND RECOMMENDATIONS

It can be concluded that other farmers and farm forum were the major sources of training available to yam farmers. Also, training on pest control and training on sorting of ill-health yam from healthy ones were the major training received. Inadequate credit and shortage of funds were the most constraints associated with post-harvest management in yam. It is recommended that farmers should source for funds and credit from non-formal sources in order to purchase post-harvest tools that are needed to enhance the longevity of agricultural produce. Traditional methods of post-harvest management that are less expensive should be adopted by farmers.

REFERENCES

Aniedu, C., & Aniedu, O.C. (2014). Impact and adoption of value-added innovations in root and tuber crops among farmers in Akwa Ibom State, Nigeria. *Asian Journal of Plant Science and Research*, 4 (3), 57-62.

Ewuziem, J. E., Ironkwe, A. G., Tokula, M. H., & Onyenobi, V. O. (2015). Livelihood Assessment of yam farmers in Omala Local Government Area of Kogi State, Nigeria. *In: Proceedings of the 49th Annual Conference of the Agricultural Society of Nigeria. Asaba, Delta State,* 9th-13th November 2015, pp 225 – 228.

National population commission (NPC), (2006). Year book on Nigeria population data. Report of the NPC. Retrieved from http://www.jstor.org. Retrieved on 02/02/17.

Niger State Geographic Information System (2015). Background information. Retrieved on 04/04/17 from www.nigergis.com/about_niger_state.

Pelemo, J. J., Ajibola, B. O., Yisa, K. M., Kolo, P. M., Silas, Y. G. and Yakubu, N. O. (2024). Analysis of Post-harvest Management Training Needs for Maize Growers in Kogi State, Nigeria, *Proceedings of the 58th Annual Conference of Agricultural Society of Nigeria* held at University of Abuja, between 21–25 October, 637-641.

Usongo, S., Idisi,P. O., Innocent, M., and Daniel, P. O. (2014). An Assessment of yam production in Ukum Local Government Area of Benue State, Nigeria. In: *Proceedings of the 48th Annual Conference of the Agricultural Society of Nigeria*. Abuja, 24th -27th November 2014. Pp 281 -284.

INCOME ANALYSIS OF IRRIGATED CUCUMBER FARMERS IN IGABI LOCAL GOVERNMENT AREA, KADUNA STATE

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ABSTRACT
The study was conducted in Igabi Local Government area of Kaduna State. The study focused on the socioeconomic characteristics of cucumber farmers and income estimates from cucumber production. Data were collected using multistage sampling technique from 154 cucumber farmers with the aid of a questionnaire. Data collected were analysed using frequency and mean per capital expenditure. Results of the analysis revealed that the average farm size was 2.28 hectares. Majority (74.7%) of cucumber farmers lack access to extension services and had large household sizes with a mean of 15 people. The mean per capita household was N367,768 while the income line was N246,405. The income line showed that majority of the cucumber farmers earned high income as 79.2% of the cucumber farmers fell above the income line. For cucumber production to serve as a livelihood enhancement, the study suggests that extension services on value addition and marketing should be provided to the farmers by the extension agents.
Keywords: Cucumber, Household expenditure, Income line.

INTRODUCTION

Agriculture was the most important economic sector of the Nigeria economic before the advent of crude oil, producing food, creating jobs and generating income from export (Adamu *et al.*, 2021). The bulk of agricultural production takes place in the rural areas. It is the main source of livelihood for the rural people, yet Nigeria's huge agricultural resource base is underperforming, despite its potential to be a major driver of economic growth and livelihood. Several factors contribute to this; insecurity, climate change, inadequate infrastructure and agriculture is rain fed in many parts of Nigeria. This leads to seasonal gluts and low price. These issues have severely impacted the agricultural production system. Cucumber production like other crops is affected by the availability of water. Zakka *et al.*, (2020) asserted that fully irrigated cucumbers produce higher yields compared to reduced irrigation. Farmers' access to supplemental irrigated water allows for all year-round production, reduces reliance on rainfall, higher yields and better quality. This can significantly improve livelihoods of farmers and food security. Premised on this, the study on income analysis of irrigated cucumber farmers was conducted. The study specifically profiled the socioeconomic characteristics of the irrigated cucumber farmers and determine their income status.

METHODOLOGY

The study was conducted in Igabi Local Government Area of Kaduna State (LGA). Igabi LGA is located in the Guinea Savannah of Nigeria on latitude $10^0$47'0"N and longitude $7^0$46'0'E. Multi-stage sampling technique was used for this study. The first stage involved purposive selection of Rigachikun and Sabon Birni districts due to the existence of Paa and Chibaki dams that support cucumber production. The second stage involves purposive selection of two villages, namely Layin Kanawa and Gadani, from Rigachikun district and 3 villages, namely Dekauro, Kawara, and Risani, from Sabon Birnin that are close to the dam and the farmers are into irrigated cucumber production. Thirdly, 154 farmers, representing 50% of the farmers were randomly selected.

Table 1: Population and sample size of the cucumber farmers

LGA	Districts	Villages	Population	Sample size
Igabi	Rigachikun	Layin kanawa	60	30
		Gadani	64	32
		Kawara	68	34
	Sabon Birni	Dekauro	52	26
		Risani	64	32
Total	2	5	308	154

Questionnaire was used to collect primary data from the cucumber farmers and analysed using descriptive statistics and two third mean per capita household expenditure per adult equivalent concept to determine the income line (Haughton and Khandker, 2009) and expressed as follows:

$AE = 1+ 0.7 (N_{1adult} – 1) + 0.5N_{2\ children}$…..…... (1)
Where AE = adult equivalent household size
N_1 = number of adult 15 years and above; N_2 = number of children less than 15 years
therefore:

$$\text{Per capita Income} = \frac{\text{cucumber farmers' income per annum}}{\text{AE}} \quad \ldots\ldots\ldots (2)$$

Mean per Capita cucumber farmers' Income (MPCI) was calculated by;

$$\text{MPCI} = \frac{\text{Total income for all cucumber per annum}}{\text{Total AE for all cucumber farmers}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

From MPCI, income lines were drawn to get high (≥ 2/3 MPCI) and low income (< 2/3 MPCI)

RESULTS AND DISCUSSION

The findings on socioeconomics characteristics of cucumber farmers is presented in Table 2. The average age, household size, farming experience and farm size of the cucumber farmers were 39.7 years, 15 people, 7.53 years and 2.28ha respectively. It can therefore be inferred that a youthful age, that are energetic dominates cucumber production in the study area. Fifteen people per household implies a large household size. This could provide farm labour, however it may be an expression of financial burden on the cucumber farmers' income especially with high dependents.

Table 2: Selected socioeconomic variables of the cucumber farmers

Socioeconomic characteristics	Classification	Frequency	Percentage	Mean
Age (years)	20-33	38	24.7	39.72
	34-47	85	55.2	
	48-61	31	20.1	
Household size (numbers)	2-9	25	16.2	
	10-17	91	59.1	
	18-25	36	23.4	15
	>25	2	1.30	
Cucumber production experience (years)	2-9	81	52.6	
	10-17	51	33.1	7.53
	18-25	22	14.3	
Farm size (ha)	0.5-2.4	103	66.9	
	2.5-3.9	43	27.9	2.28
	<5	8	5.2	
	Total	154	100	
Sources of information	Radio	50	32.5	
	Television	40	26.0	
	Newspaper	30	19.5	
	Family/friends	19	12.3	
	Radio/television	12	7.8	
	All of the above	3	1.9	
Education status	No formal education	22	14.3	
	Primary	35	22.7	
	Secondary	34	22.1	
	Tertiary	24	15.6	
	Adult Literacy	39	25.3	
	Total	154	100	

Farming experience of 7.53 years implies that more of the farmers have reasonable years of experience in cucumber production, but they are small scale producers. Finding on these were supported by Ojo, (2013) that skilled acquired in any business is a proxy of years of experience in an enterprise and Okwuokeneye (2021) report of 1.74ha as the farm size cultivated by cucumber farmers. Reliable information sources are crucial for farmers to make informed decision that will enhance their productivity. The most used source of information was radio by 32.5%, followed by television (26%), newspaper (19.5%) and families/friends (12.3%). The use of radio more than others sources could be due to the ease of obtaining a transistor radio by rural people. Finding by Ojo *et al.* (2021), identified radio, television, friends and colleagues as information sources mostly used by the farmers. Cumulatively 85.7% of the cucumber farmers had one form of education though at a low level. This level of education can improve their production by enhancing their knowledge and skills on input use, pest/diseases prevention and other management practices.

Methods of land ownership indicated by the cucumber farmers include purchase (3.9%), gift (13%) and inheritance (42.9%). Cumulatively, 59.8% of the cucumber farmers had secured land tenure. This could serve as an incentive for long-term investment for the cucumber farmers. Other land ownership methods include borrowing (3.9%) and rent 36.4% (Table 3).

Table 3: Distribution of the cucumber farmers-based extension visit, credit and sales outlet

Variables	Classification	Frequency	Percentage	Mean
Land acquisition method	Purchased	6	3.9	
	Gift	20	13.0	
	Inherited	66	42.9	
	Rent	56	36.4	
	Borrowed	6	3.9	
Extension visits	No	115	74.7	
	Yes	29	25.3	
Access to credit and amount received (₦)	No access	77	50.0	
	22,000- 221,999	55	35.7	85, 727
	222,000-421,999	20	13.0	
	>422,000	2	1.30	
Sales outlets	Middle-men (off takers)	98	63.6	
	Village market	16	10.4	
	Farm site	40	26.0	
	Total	154	100	

Majority (74.7%) of the cucumber farmers do not have access to extension service while 50% of them obtained credit. The mean amount of credit obtained by the beneficiaries was N85,727 (Table 3). Findings is similar to Godfrey *et al.*, (2021), who found that majority of cucumber farmers lacked access to extension services and credit facilities. The main sales outlets used by 63.6% of the cucumber farmers was middle men (off takers). Sale through middle men could potentially lower cucumber farmers' income due to exploitative tendencies of the middle men. Other sales outlets include local market (10.6%) and selling to individuals at farm site (26%) (Table 3).

Income line estimates of the cucumber farmers

Result in Table 4 showed that 98.8% of the cucumber farmers earned N950,000-999,000 per annum while the remaining 1.2% earned above N 1,000,000 per annum. The mean per capita expenditure of N367,768 was obtained. The result further showed that income line which is the two-third of the cucumbers' MPCI was N246,405. Based on this, 79.2% of the cucumbers were above the income line and categorized as high. It can therefore be inferred that majority of the cucumbers studied earned high income from cucumber production.

Table 4: Income estimate based on income earned from cucumber production

Income	Frequency	Percentage	Mean	2/3 household income
950,000-999,000	152	98.8	367,768	246,405
1000.000-1,199,999	1	0.6		
>1,200,000	1	0.6		
Income line				
Low	32	20.0		
High	122	79.2		
Total	154	100		

CONCLUSION AND RECOMMENDATIONS

The study established that a youthful age group dominated cucumber production in the study area. They cultivated small farm size, extension services is inadequate and 50% of the cucumber farmers had access to credit facilities. The study also established that majority of the cucumbers studied earned high income as 79.2% of the cucumber farmers fell above the income line. Cucumber has short growing period and can be produced more than twice in a year. For cucumber production to serve as a livelihood enhancement, the study suggests that extension services on value addition and marketing information should be provided to the farmers by the extension agents.

REFERENCES

Adamu, B.D., Tanko, F., Barnabas, T. M., & Adejoh, E.U. (2021). Determinants of household's poverty among crop farmers in Kaduna state, Nigeria. *FUDMA Journal of Sciences*. *5*(1) :529–538.

Godfrey, O., Okeke-Agulu, K.I., Jesse B., & Alamanjo, C.C. (2021). Technical efficiency of cucumber production in Jos-East, Plateau State, Nigeria. *Int'l Journal of Agric. and Rural Dev.* 24(2):5740-5750

Haughton, J.H. and Khandker, R. (2009). *Measuring poverty*. World Bank Publications 2. www.siteresourcesworldbank.org/

Okwuokeneye, G.F. (2021). Farmer's perception of farming cucumber in greenhouse for increased productivity in NOUN Farms, Kaduna, Nigeria: an extension approach. *International Journal of Agriculture and Rural Development*. 23(2):5265-5273.

Ojo, I.H., Sennuga, S.O., Kagbu, J.H., & Omokore, D.F. (2021). Assessment of women farmers' sources of information on the adoption of improved cassava production technology in Mopamuro Local Government Area, Kogi State, Nigeria. *Journal of Agricultural Economics, Extension & Social Sciences.* 4(1):78-85. http://www.jaeessuj.cor

World Bank (2022c). *Nigeria Poverty Assessment 2022: A Better Future for All Nigerians.*

Zakka, E.J., Onwuegbunam, N.E., Dare, A., Onwuegbunam, D.O. and Emeghara, U.U. (2020). Yield, water use and water productivity of drip-irrigated cucumber in response to irrigation depths and intervals in Kaduna, Nigeria. *Nigerian Journal of Technology*. 39(2):613-620.

ASSESSMENT OF DIETARY DIVERSIFICATION PATTERNS AMONG RURAL HOUSEHOLDS IN OSUN STATE, NIGERIA

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ABSTRACT

Food is indispensable to human life. It is important at the household level as a basic means of sustenance. The more food groups included in daily diet, the greater the likelihood of meeting nutrient requirements because all nutrients cannot be found within a single food. This study, therefore, assesses dietary diversification pattern among rural households in Osun State, Nigeria. A multistage sampling technique was utilised to select a total of 190 respondents for the study. Data was collected and analysed using both descriptive and inferential statistics. The findings of the study revealed that mean age of the respondents was approximately 42 years, with the majority (87.2%) being male, and 70% had secondary education. Results showed that more than half (55%) of the respondents had low level (1-4 food group) of dietary diversification pattern and only about 18% had high level (>6 food groups) of dietary diversification. The study also revealed that preference for traditional carbohydrate foods ($\bar{x}$=3.5) is the most severe constraint to dietary diversification among rural households. Age (p=0.002), Gender (p=0.006) and household size (p=0.006) were found to be positively significant in relation to respondents' level of dietary diversification. It is recommended that government should launch food diversification programs in rural areas to increase information on food consumption to improve household dietary diversity score.

Keywords: Diversification, Dietary, Households

INTRODUCTION

Agriculture plays a major role in producing and improving people's access to the nutritious food needed for healthy and productive lives (Akerele, Sanusi and Fadare, 2017). The more food groups included in daily diet, the greater the likelihood of meeting nutrient requirements because all nutrients cannot be found within a single food item (Adam, Johana and Connie, 2019). Dietary diversification became a problem to the whole world in maintaining health conditions through the habit of food group consumption by adding health dimension to the issue of food calorie consumption. Access to nutritionally adequate and good quality diet is highly important to human health, productivity and work output (Savy, Martin and Delpeuch 2005). Similarly, annual child death associated with undiversified diets is more than 3million, while 165 million children under the age of five are retarded in growth and 52 million are wasted in low and middle income countries (Black, Victoria and Walker, 2013). In developing countries, dietary diversification is a widespread challenge among rural dwellers, their diets are usually based on carbohydrate food with insufficient animal products, fresh fruits and vegetables, more than half of the Nigerian subjected to severe social deprivation, and many households are nutrition and food insecure (Akinyele, 2009). The recommendation of World Health Organization for energy intake per person between 2500 – 3400 Kcal and 65-86g crude proteins per day out of which 35g must be animal protein (Babatunde and Qaim, 2010).

The general objective of the study was to assess dietary diversification pattern of rural households in Osun Stat

The specific objectives are to:

1. Describe the respondents' socio-economic characteristics
2. Identify the component of food consumed by rural households
3. Identify the constraints to respondent's ability to diversify their diets in the study area.

METHODOLOGY

Osun state is divided into four zones by Osun State Agricultural Development Programme (OSSADEP). These are; Osogbo Agricultural zone, Ife Agricultural zone, Ijesha Agricultural zone and Iwo Agricultural zone. The study covered ADP zones in all. Iwo zone contains 7 blocks, Osogbo zone has 13 blocks while Ife/Ijesha has only 11 blocks making total number of 31 blocks. Each block contains 8 cells. A multistage sampling procedure was utilised for the selection of the respondents. From the three OSSADEP zones in Osun State (Osogbo, Iwo and Ife/Ijesha).In the first stage 40% of the block from each zone was sellected , 3 blocks from Iwo zone (Ayedire, Olaoluwa and Irewole), 5 blocks from Osogho zone (Ifelodun, Odeotin,a Ede North, Ede South and Irepodun) and 4 blocks from Ife/Iliesha zone (Ife North, Ife East, Ife South and Obokun) . The second stage was the random selection of 20% of each cell from each of the selected blocks. The third stage was random selection of 10 respondents from each of the selected cells making a total of 190 as sample size.

RESULT AND DISCUSSION

Results in Table 1 showed the socioeconomic characteristics of rural households in Osun State. The mean age of the rural households is 42.31 and the mean distribution of the respondents revealed that 37.8% are between 21-30, 31-40 are 6.1%, 41-50 are 45.6% while 51-60% were 12.8. This implies

that the rural households of age range between 41-50 are highly active in rural area in term of production. Further finding revealed that 87.2% are male, and 12.8% were female. This implies that both sexes contribute to household wellbeing as head of the households and majority of the household were males who more actively involved in farming in the sturdy area. Also, the study revealed that 87.8% are married, Divorced are 6.1% and widowed were 6.1%. This opposed the findings of Yusuf and Adisa (2011) which established widowhood mainly accounted for the emergence of female headed households in Osun State with majority of female head of the households. Findings in Table 1 also revealed that 33.9% of the rural households are farmers, Trader are 33.9%, Artisan are 20% and others were 12.2%. This indicated that farming is the most pronounced occupation in a rural setting.

The household head farming experiencet showed that mean age of the respondents was 1.56 and the distribution of the respondents revealed that 50% are between 1-10, 11-20 are 43.9% and 21-30 were 6.1%, the age of the head of household determined his experience. Also, result from table 1 showed that majority (82%) of the respondents had between 3 and 5children with mean size of 6.0. This could be regarded as large family size. However, it is likely that these children will be used as source of manual labour in the household, also the age at marriage will have an impact on family size. The implication of this finding is that the quantity of food intake will be affected, and dependency ratio will be affected. The larger the family size the lesser food availability to each person within the household and nutritional status will be diminished. This is in line with report of Adebayo *et al* (2012).

Table 1: Socioeconomic characteristics of the study population

Variables	Frequency	Percentage	Mean±SD
Age			
21-30	68	37.8	42.31/12.11
31-40	11	6.1	
41-50		43.3	
51-60	78	12.8	
	23		
Gender			
Male	157	87.2	
Female	23	12.8	
Marital status			
Married	158	87.8	
Divorced	11	6.1	
Widowed	11	6.1	
Others	22	12.2	
Household size			
<5	53	29.5	
5 - 7	8	45.5	
8 - 10	44	24.4	
Household head annual income			
0-100000	79	43.9	
100001-200000	78	43.3	
200001-300000	23	12.8	

Table 2 showed that 55% of the respondents consumed lowest group of food (1-**4)** while 18.3% consumed the highest group of foods. The implication is that most of the rural households are feeding on imbalance food that does not contain complete nourished food enough for body nutritional requirements. This is in line with the finding of Abiodun,O (2018) whereby cereals were majorly consumed by all households and animal-based protein foods were below 40% like the finding of Kiboi (2016). Also, similar with the finding of Nabuuma et al, (2018) white roots, tubers and bananas were by far the most consumed food group in the rural settings.

Table 2: Component of food consumed in the last 72 hours for dietary

Food Groups	Frequency	Percentage
1-4	99	55.0
5-6	48	26.7
>6	33	18.3

Source: Field survey, 2020

Table 3 revealed that the preference to the traditional foods (3.50) and ignorant about nutrient intake (2.93) were considered to be the most serious of all constrains while not allowing woman to take decision about the nutrition of the family (1.18) and poor storage and processing problem (1.12) were considered to be less serious constrains. The implication of this is that traditional foods are adamantly consumed by rural households with the objective of physical fitness for farming activities without considering the nutrient contents either balanced or imbalanced and the access to the nutrition information subjected them to be ignorant about nutrient intake. This is similar to the finding of Meludu et al, (2008) rural households have less access to nutritional information to gain more knowledge about food intake.

Dietary diversification constraints	SA	A	U	D	SD	Mean/SD	Ranking
Preference traditional foods	12	157	11	0	0	3.50/1.50	1ST
Ignorant nutrient intake	0	85	95	0	0	2.93/1.06	2ND
Poor storage	120	60	0	0	0	1.12/0.4	8TH
Inadequate money	169	0	11	0	0	2.5/0.50	5TH
Not allowing woman	0	90	90	0	0	1.18/0.522	9TH
Inadequate farm Implement	11	79	90	0	0	1.57/0.62	7TH
Inability to Access Foods	90	78	12	0	0	2.56/0.61	3rd
Inadequate Infrastructure	0	90	79	11	0	2.43/1.18	4th
Poor access to loan	79	90	11	0	0	2.05/1.01	6th

Source: Field Survey, 2020

CONCLUSION

Based on research finding the following conclusion can be deducted that there was no adequate information on food consumption from extension agents and health experts, low annual income of respondents, Preference to traditional foods and they were highly ignorant of diverse diet all these consequently resulted to consuming inadequate food groups which imbalance diets with low dietary diversification score. Therefore, these socioeconomic characteristics not only affect the household dietary diversification score but also influence the status of the rural household.

RECOMMENDATIONS

Based on the conclusions of the findings, the following are recommended for policy implementation:

1. Government should launch food diversification programs in rural areas to increase information on food consumption in order to improve household dietary diversity score.
2. Government should implement such policies to increase and improve the education level of rural households, that would finally increase their income.
3. Government should provide incentive such as soft loan facilities that would improve livelihood of rural households in order diversify their food intake.
4. Non-governmental organizations and individuals should put in place programmes that can sensitise rural households in the rural areas on the concept of dietary diversification and hence, would enable them to overcome certain constrains about dietary diversification.

REFERENCES

Abiodun, O. O., (2018) Economics of food intake, nutrition and farm households' health in Southwest Nigeria, https://www.researchgate.net/publication/326396009

Adebayo Oyefunke Olayemi (2012): "Effects of Family Size on Household Food Security in Osun State, Nigeria", Asian Journal of Agriculture and Rural Development, Vol. 2, No. 2, pp. 136-141.

Babatunde, R. O., & Qaim, M. (2010). Impact of off-farm income on food security and nutrition in Nigeria. *Food policy*, *35*(4), 303-311.Akerele, D., & Odeiyi, K. (2015). *Demand for diverse diets: evidence from Nigeria* (No. 357- 2016-18326).

Akinyele, I. O. (2009). Ensuring food and nutrition security in rural Nigeria: an assessment of the challenges, information needs, and analytical capacity.

Anna-Sophia, S. (2017), local perceptions influencing the consumption of a diverse diet in Vihiga county, Kenya, Major Public Health Nutrition Azadbakht, L., Mirmiran, P. and Azizi, F.

Kiboi, W., Kimiywe, J., & Chege, P. (2016). Dietary diversity, nutrient intake and nutritional status among pregnant women in Laikipia County, Kenya. *International Journal of Health Sciences & Research*, 378-379.

DETERMINANTS OF UTILISATION OF PUBLIC AGRICULTURAL ADVISORY SERVICES AMONG WOMEN FARMERS IN LAGOS AND OSUN STATES, NIGERIA: AN EXPLORATORY FACTOR ANALYSIS

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ABSTRACT

Agricultural Advisory Services (AAS) offered by private and public entities are essential for transforming agricultural systems by enabling farmers to make informed decisions for innovation adoption and improved standard of living. The use of AAS by women farmers is influenced by several factors and understating factors determining their use of AAS is crucial as they are key role players in agriculture. A four-stage sampling procedure was used to select AAS users. One senatorial district each was randomly selected from the two states, and two Local Government Areas (LGAs) were randomly chosen from selected LGAs in Osun and Lagos. Thereafter, 30% of the wards in each selected LGA and 20% of registered farming households in each ward were randomly selected to give 126 women farmers. Prominent private AAS agencies (two in Lagos State and one in Osun State) were purposively selected. Thereafter, 39 women farmers in Lagos and 45 in Osun were randomly sampled, proportionate to size. Respondents of both sources were identified during the reconnaissance survey, and 97 were purposively selected to give a total of 307 for the study. Structured questionnaire was used to elicit information from respondents. Exploratory factor analysis identified nine key factors: source, contents, context, medium, membership of cooperative society, time, domestic duties, participation, and societal influence. Contents, sources of AAS, domestic responsibilities, etc., were some of the factors associated with utilisation of AAS by public, private, and both sources' users, respectively. AAS programmes should consider flexible training schedules and provision of childcare during training sessions.

Keywords: Agricultural service providers, Advisory services utilisation, Extension delivery system

INTRODUCTION

Effective delivery of Agricultural Advisory Services (AAS) has gained wider recognition as an essential service for any transformation in agricultural systems, as well as addressing global social and economic development objectives (USAID, 2019). Agriculture is important to development and women in underdeveloped countries are major sources of labour despite their already crowded domestic tasks. However, their contributions to the agricultural and domestic sectors remain largely unrewarded. Nigerian women are key role players in the agricultural value chain; they are strategic drivers for food processing, storage and preservation, thereby ensuring food security and improved standard of living of their households and communities (Amaonwu, 2024). Several number of factors that influence utilisation of AAS among women farmers; women farmers have little opportunities to agricultural information and often continue use of new practices and technologies at a lower rate compared to male farmers. This limits their agricultural output (Dar *et al.*, 2020), with direct implications on their revenue, sustenance and well-being as well as other rural dwellers. Hence, these influential factors are of critical research interest. This is to enable inform stakeholders on how advisory services delivery to women-farmers could be improved. Therefore, this study assessed the determinants of utilisation of public agricultural advisory services among women farmers in Lagos and Osun States, Nigeria. The specific objectives were to: (i) determine the social-economic attributes of women farmers in the area of study; (ii) investigate factors that determine women farmers' utilisation of selected AAS in the study area; (iii) ascertain the constraints faced by women farmers in utilising public agricultural AAS in the study area.

METHODOLOGY

The focus of this study is Lagos and Osun States in Southwestern Nigeria. Lagos State, although being Nigeria's smallest state, has a total land area of around 357,700 hectares (ha), with roughly 169,613 ha dedicated for agricultural. Osun State lies between Longitude 21.65° and 6.75° East of Greenwich meridian and Latitudes 7° 30' North and longitude 4o 30' East, with a land mass of 14,875 sq km and estimated human population of 4.7million.

For this study, a three-stage sampling procedure was used to select the respondents.

Stage 1: Involved selection of two agricultural zones in Lagos state (Far East and East), and one agricultural zone in Osun State (Iwo) proportionately to size. Stage 2: A simple random selection two extension blocks from each of the selected agricultural zones. Far-East (Ibeju and Lekki), East (Odogunyan and Imota) and Iwo (Ejigbo and Irewole). Stage 3: involved simple random sampling of 20% of women farmers registered with the Lagos and Osun States ADPs, in

total 126 women farmers were interviewed using structured questionnaire. Data collected was summarised using descriptive statistics and exploratory factor analysis (EFA).

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 reveals the age distribution of respondents with a mean age of 46.48 ± 12.22 years. A small proportion of the respondents (11.1%) were over 60-year-old and 12.7% were younger than 31 years. The majority (54.8%) fell within the age bracket, 41 to 60-year-old. This observation aligns with the report by Nwaiwu et al. (2022), which indicated an average age of 44.00 years for women engaged in farming. Among those who had formal education, 26.2% had First School Leaving Certificate; 33.3% with secondary school leaving certificate; only 9.5% held a NCE/ND certificates and 2.4% completed first degree. Low educational level of farmers may negatively influence their ability to utilise agricultural advisory services as also observed by Zhou *et al.*, (2024). The average family size among respondents was 6.7 ± 3.51. Table 1 further revealed that 67.5% of the respondents had households of 5 to 8 members, 11.9% had households of 1 to 4 members and 20.6% had households of more than eight members. The mean household size aligns with the national average (6 people per household) for rural areas, as reported by the Mukaila *et al*. (2021). Monthly income earned by the respondents on the average was N 73,580.36 ± N 107, 093.17. The implication of this is that most of the respondents earned far below the mean average income, which may negatively impacted utilisation of agricultural advisory services.

Results in Table 1 further show that average years of farming experience among the respondents was 17.29±13.03 years. A good number (68.2%) of the respondents had several years of farming experience that clustered around the average value. Farmers' experience measured in years have high likelihood of influencing utilisation of AAS.

Table 1: Distribution of respondents according to socio-economic characteristics (n = 126)

Variables	Women farmers	
Age (years)	Percent	Mean / Std dev.
<31	12.7	46.48 ± 12.22
31 - 40	21.4	
41 - 50	28.6	
51 - 60	26.2	
>60	11.1	
Highest educational attainment		
No formal Education	27.8	
Primary	26.2	
Secondary	33.3	
NCE/OND	9.5	
HND/B.Sc.	2.4	
M.Sc.	0.8	
Household size		
1-4 persons	11.9	$\bar{x}$ = 7.07± 2.78
5-8 persons	67.5	
>8 persons	20.6	
Average monthly income from agric. enterprise (₦)		
<30,000	27.7	$\bar{x}$ = 73580.36±107093.18
30,000-59,999	34.9	
60,000-89,999	12.7	
90,000 and above	24.6	
Farming experience		
<10 years	31.7	$\bar{x}$ = 17.29±13.03
10-19 years	26.2	
20-29 years	22.2	
>29 years	19.8	

Exploratory factor analysis

Table 2 shows the factor loading of 32 items under eight factors. The table further reveals that among the respondents, informal sources (loading: 0.528) were highly rated as advisory service sources. This finding aligns with Shitaye *et al.* (2025), who found out that smallholder famers prefer informal sources of agricultural information because of trust,

nearness and local relevance. In terms of content, technical skills (loading 0.707), inputs (loading 0.631), technologies (loading 0.650), and group dynamics (loading 0.737) were emphasised. Contextually, supportive conditions (loading 0.603) were also rated highly. This finding corroborated Kersten *et al*. (2022) who highlighted contents and contextual factors as great influence on learning. In addition, Table 2 shows that group contact method (0.585) and mass media (0.562) were highly rated as delivery methods for public agricultural advisory services. Regarding participation, full participation (0.738) was rated highly and this indicated that full participation was a major factor for respondents using the public advisory services. According to Muhammed (2019), farmers groups are seen as an effective means to enhance farmers' productivity and well-being since production information can be readily exchanged among members.

Furthermore, domestic responsibilities such as cleaning (0.639), cooking (0.512), and caregiving (0.652) were rated highly; this revealed that women still face the pressure of balancing household chores with economic activities. According to IFAD (2016), domestic chores are significant constraints preventing smallholder women-farmers from increasing their agricultural productivity.

Factors associated with utilisation of public agricultural advisory services

Determinants	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Formal	0.431	0.118	0.236	0.035	0.268	0.241	0.4655	0.050
Informal	**0.528**	0.166	0.173	0.462	0.048	0.019	0.178	0.073
Technical skill	0.427	**0.707**	0.076	0.163	0.066	0.141	0.073	0.140
Inputs	0.390	**0.631**	0.085	0.260	0.162	0.238	0.034	0.244
Technologies	0.449	**0.650**	0.138	0.180	0.010	0.223	0.054	0.062
Group dynamics	0.121	**0.737**	0.068	0.294	0.104	0.127	0.020	0.093
Farm records	0.041	0.218	0.006	0.192	0.077	0.053	0.088	0.104
Health management	0.414	0.439	0.015	0.164	0.047	0.029	0.103	0.068
Credit facilities	0.398	0.445	0.039	0.126	0.044	0.053	0.058	0.023
Individual	0.084	0.018	0.211	0.044	0.346	0.241	0.153	0.085
Group	0.392	0.210	**0.585**	0.173	0.188	0.086	0.129	0.441
Mass	0.009	0.019	**0.562**	0.434	0.012	0.053	0.250	0.063
Cooperative society	0.429	0.000	0.113	0.338	0.310	0.396	0.096	0.405
Supportive condition	0.358	0.302	0.092	**0.603**	0.016	0.008	0.103	0.241
Resources	0.179	0.415	0.057	0.348	0.012	0.377	0.072	0.107
Full participation	0.276	0.204	0.112	0.370	**0.738**	0.249	0.007	0.180
Partial participation	0.258	0.449	0.166	0.442	0.165	0.285	0.158	0.108
Non participation	0.215	0.046	0.168	0.134	0.296	0.163	0.339	0.122
Production season	0.347	0.317	0.031	0.418	0.183	**0.576**	0.358	0.306
Off season	0.149	0.310	0.311	0.286	0.214	0.243	0.297	0.105
Laundry	0.051	0.082	0.087	0.577	0.103	0.037	0.314	0.125
Cleaning	0.389	0.421	0.153	0.070	0.071	0.213	**0.639**	0.115
Reproduction	0.378	0.442	0.088	0.127	0.093	0.059	0.211	0.071
Cooking	0.424	0.088	0.073	0.058	0.089	0.066	**0.512**	0.074
Caregiving	0.018	0.422	0.391	0.093	0.145	0.059	0.652	0.017
Conformity	0.157	0.056	0.476	0.186	0.037	0.052	0.199	0.666
Obedience	0.217	0.195	0.347	0.287	0.348	0.240	0.302	0.387
Compliance	0.206	0.107	0.124	0.425	**0.537**	0.173	0.233	0.116

*Factors: 1= sources of advisory services; 2=contents of advisory services, 3= Medium of delivery; 4= context of advisory services; 5= Participation; 6 = Time; 7= Domestic responsibilities; 8= societal influence

Constraints toward utilising agricultural advisory services

Women faced significant challenges in utilising Agricultural Advisory Services (AAS). The mean scores indicated that the top challenges were cash shortage ($\bar{x}$ = 1.83) and high input costs ($\bar{x}$ = 1.77) respectively. The rising prices of agricultural inputs have been a serious threat to agricultural production over the years. Okojie (2023) reported that high input costs force farmers to reduce their cultivation areas and this leads to increased food insecurity. When input costs are high and cash is short, utilisation of both the new and existing agricultural advisory services by farmers becomes difficult. In addition, women farmers complained about the lack of easy access to AAS, which could have mitigated the effects of high input costs and cash shortage. In most developing countries women find it difficult to access and utilise agricultural advisory services. Adebayo and Worth (2024) also reported that

women farmers have limited or no contact with agricultural extension aids.

Distribution of constraints toward utilising AAS by the respondents (n = 126)

Constraints	Not a challenge (%)	Mild challenge (%)	Serious challenge (%)	Mean
Small land size	31.0	19.0	50	1.19
Shortage of cash	5.6	5.6	88.9	1.83
Cultural influences	41.3	23.8	34.9	0.94
Lack of female extension workers	47.6	25.4	27.0	0.79
High cost of inputs	7.1	8.7	84.1	1.77
Lack of easy access to AAS	24.6	17.5	57.9	1.33
Domestic duties	38.1	7.1	54.8	1.17

CONCLUSION

Women farmers in the study area are nearing the end of reproduction and caregiving roles, which is favourable to utilisation of public agricultural advisory services. These women are faced with challenges of shortage of cash, high cost of inputs, lack of easy access to extension services and domestic duties; these challenges informed the reason they prefer informal source of AAS, which is close-by and always available with no cost implication. Improving their technical skills and provision of inputs and technologies, and full participation from the beginning to the execution stage, are some of the factors that will endear the women to utilise public AAS.

REFERENCES

Adebayo, J. A. and Worth, S. H. 2024. Profile of women in African Agriculture and Access to Extension Services. *Journal of Social Science and Humanities Open, volume 9*, 2024, 100790. Doi: 10.1016/j.ssaho/2023

Amaonwu, U. 2024, Nigerian women in agriculture: A catalyst for food security, economic growth and family well-being. The Cable News, March 14, 2024, 3:35pm. thecable.ng

Dar, M. H., Waza, S. A., Nayaki, S, Chakravorty, R, Zaidi, W. N and Hossain, M. 2020. Drought Tolerant Rice for Ensuring Food Security in Eastern in India. *MDPI Journal of Sustainability. Vol. 12(6)*

IFAD 2016. Reducing rural women's domestic workload through labour-saving technologies and practices.

Kersten, M. C. O., Taminiau, E. F., Weggeman, M. C. D. P., and Embregts, P. J. C. M 2022. Contextual factors related to the execution of knowledge strategies in intellectual disabilities Organisations. *Journal of Cooperate Transformation*, vol. 29, issue 3. https://doi.org/10.1002/kpm.1700.

Mukaila, R., Falola, A. and Egwue, O. L. 2021. The Determinants of Rural Households' Income in Nigeria. *Fiscaeconomics 5* (3): 978-989

Muhammed Y., Akpoko, J. G., Musa W. M., Ajayi, O. J., & Muhammad, H.U. (2019). Factors Influencing Participation of Cassava Farmers in Survival Farming intervention Programme in Kogi state, Nigeria. *Journal of Agricultural Extension, vol. 23 (2).* Food and Agricultural Organisation (FAO), CABI and Scopus.

Nwaiwu, J. C., Esiobu, N. S., Onyeike, G. C. E. and Ndinechi, P. C. 2022. Analysis of Vegetable Production among Rural Women Farmers in Imo State, Nigeria. *International Journal of Agriculture and Research,* 5 (5).

Okojie, J. 2023. Farmers struggle with rising inputs cost. Business Day Newspaper Article of June 13, 2023. https://businessday.ng/agricultural/article/ farmers- struggle-with-rising-inputs-cost.

Zhou, D., Zha, F, Qiu, W., & Zhang, X. 2024. Does Digital Literacy Reduce the Risk of Returning to Poverty? Evidence from China. *Science Direct, vol. 48 (6)*

ASSESSMENT OF THE SURVIVAL STRATEGIES OF FEMALE-HEADED FARMING HOUSEHOLDS AGAINST SOCIO-ECONOMIC CHALLENGES IN EZZA NORTH LOCAL GOVERNMENT AREA OF EBONYI STATE, NIGERIA

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ABSTRACT

The study assessed the survival strategies of female-headed farming households against socio-economic challenges in Ezza North Local Government Area of Ebonyi State, Nigeria. A multistage sampling procedure was used to select 100 respondents for the study. The results were analysed using descriptive statistics such as mean and standard deviation. Findings revealed that crop farming ($\bar{x}$ = 3.91), self-care ($\bar{x}$ = 3.90), and trading ($\bar{x}$ = 3.53) were the most utilised survival strategies, while fish farming ($\bar{x}$ = 1.04) and poultry farming ($\bar{x}$ = 1.12) were least adopted. Major constraints included stipulated mourning periods ($\bar{x}$ = 3.92), lack of decision-making power ($\bar{x}$ = 3.91), and male dominance ($\bar{x}$ = 3.87). The study concludes that female-headed households depend largely on low-capital livelihood activities such as hawking, constrained by socio-cultural factors. It recommends improving women's access to credit while addressing gender-based barriers to improves livelihood sustainability.

Keywords: *Female-headed households, Survival strategies, Socio-economic challenges, Livelihood resilience*

INTRODUCTION

Agriculture remains the mainstay of Nigeria's rural economy, providing employment and livelihood for the majority of its population, particularly women. Despite their significant contribution to food production, women in rural areas continue to experience limited access to productive resources and social opportunities compared to their male counterparts (Ejinkeonye et al., 2022). Female-headed farming households, often emerging due to widowhood, divorce, migration of spouses, or single parenthood, face unique socio-economic challenges that threaten their livelihood sustainability and food security. These women must therefore adopt various survival strategies to cope with the pressures of poverty, gender discrimination, and socio-cultural limitations within their communities (Ejinkeonye et al., 2022).

In Nigeria, the socio-economic vulnerability of female-headed households has been compounded by poor access to land, credit, extension services, and market opportunities. Such households are often marginalized in decision-making processes, and their participation in profitable agricultural activities remains limited. As Mezie-Okoye (2021) notes, patriarchal dominance and gendered norms perpetuate inequalities that restrict women's autonomy and economic empowerment. Consequently, many female household heads rely on small-scale farming, petty trading, self-care practices, and informal labour as survival strategies, even though these avenues often provide minimal income and uncertain sustainability (Adewale et al., 2021).

The resilience of these women in the face of socio-economic challenges underscores the need for an in-depth assessment of the strategies they employ and the constraints that hinder their effectiveness. Understanding these dynamics is vital for designing gender-responsive policies and interventions aimed at improving their livelihoods. Studies such as those by Okeke and Okoye (2019) have emphasized that identifying and strengthening women's adaptive strategies can serve as a pathway to enhancing rural household welfare and reducing poverty.

The general objective of the study is to assess the Survival Strategies of Female-Headed Farming Households against Socio-Economic Challenges in Ezza North Local Government Area of Ebonyi State, Nigeria. The specific objectives are to:

i. identify the survival strategies adopted by female-headed farming households.
ii. determine the extent of utilisation of these strategies; and
iii. examine the major constraints affecting their ability to sustain livelihood activities.

METHODOLOGY

The study area is Ezza-North Local Government Area of Ebonyi State. A purposive sampling procedure was used to select the respondents. The stages involved the selection of five communities and twenty (20) female-headed households per community to make one hundred (100) respondents. Data was analysed using descriptive statistics such as mean and standard deviation

RESULTS AND DISCUSSION

Survival strategies

The result shows that crop farming ($\bar{x}$ = 3.91) and self-care ($\bar{x}$ = 3.90) were utilised to a very great extent, while trading ($\bar{x}$ = 3.53) was also highly utilised. This indicates that female-headed households rely mainly on agricultural activities and personal resilience mechanisms such as self-discipline, food rationing, and self-help practices to cope with socio-economic challenges. This finding aligns with Adewale et al. (2021), who noted that farming remains the most sustainable livelihood strategy among rural female farmers due to limited access to non-farm income opportunities

Strategies such as fish farming ($\bar{x}$ = 1.04), poultry farming ($\bar{x}$ = 1.12), public service employment ($\bar{x}$ = 1.20), savings ($\bar{x}$ = 1.65), artisan work ($\bar{x}$ = 1.97), prostitution ($\bar{x}$ = 1.72), and child trafficking ($\bar{x}$ = 1.98) were utilised to a low or very low extent. This suggests limited diversification due to financial constraints, lack of technical skills, and cultural or moral boundaries. According to Ogunlela and Mukhtar (2009), limited access to productive resources and credit facilities remains a major barrier to women's participation in more profitable livelihood ventures. The study further indicates that labour work ($\bar{x}$ = 2.68) was adopted to a moderate extent, implying that some female heads supplement income through casual labour during periods of food or income scarcity.

Table 1: Survival strategies of the respondents

Variables	VGE	GE	LE	VLE	$\bar{X}$
Self-care	91	8	1	0	3.90
Trading	70	18	7	5	3.53
Fish farming	0	0	4	96	1.04
Poultry farming	0	2	8	90	1.12
Crop farming	94	3	3	0	3.91
Saving	5	15	20	60	1.65
Artisan	15	17	18	50	1.97
Public services	3	5	1	91	1.20
Labourer	41	14	17	28	2.68
Prostitution	8	17	14	61	1.72
Child trafficking	15	22	9	54	1.98
Hawking	71	18	8	3	3.57

VGE= Very Great Extent, GE= Great Extent, LE=Low extent, VLE= Very low extent
Source: Field Survey, March 2024

Constraints to livelihood activities

The major constraints identified in table 2 include stipulated period of mourning ($\bar{x}$ = 3.92)**,** lack of decision-making power ($\bar{x}$ = 3.91)**,** lack of access roads for extension visits ($\bar{x}$ = 3.88**)**, and male dominance influence ($\bar{x}$ = 3.87)**.** These results imply that socio-cultural norms and patriarchal systems continue to exert significant influence on the livelihood decisions of female-headed households. Prolonged mourning periods, cultural taboos, and male-dominated decision structures limit women's ability to manage farms effectively and participate in productive activities. This finding is consistent with Aina (2017**)**, who observed that socio-cultural restrictions and gender bias significantly hinder women's participation in agricultural decision-making in southeastern Nigeria. Other notable challenges include poor socio-economic status of women ($\bar{x}$ = 3.68)**,** illiteracy ($\bar{x}$ = 3.48)**,** and maltreatment by in-laws ($\bar{x}$ = 3.47)**.** These constraints highlight the vulnerability of female-headed households, who often lack education and access to economic resources. According to Olaoye and Ajayi (2020)**,** low literacy levels among rural women reduce their ability to access agricultural innovations and extension services, thereby limiting their capacity to adopt improved survival strategies.

In addition**,** lack of adequate funds ($\bar{x}$ = 2.65**)** and favouritism in input distribution ($\bar{x}$ = 2.78) were reported as moderate constraints, indicating that financial exclusion and institutional bias still affect the economic empowerment of women. This agrees with Ogunbameru and Idrisa (2016)**,** who noted that limited access to credit facilities and unequal input allocation discourage women from expanding their farming operations.

Constraints	Mean	Standard Deviation
Male dominance influences	3.87	3.683
Poor socio-economic status of woman	3.68	3.089
Maltreatment by in-laws	3.47	3.250
Illiteracy	3.48	3.504
Lack of adequate funds	2.65	2.716
Age-related problems	2.52	2.985
Favouritism in input distribution	2.78	2.985
Lack of decision-making power	3.91	3.882
Lack of access roads for extension visits	3.88	3.267
Stipulated period of mourning	3.92	3.969
Lack of farm information	3.10	2.579

Similarly**,** age-related problems ($\bar{x}$ = 2.52**)** and lack of farm information ($\bar{x}$ = 3.10**)** also pose moderate challenges, as aging female farmers and limited information flow hinder timely decision-making and adaptation to changing agricultural practices.

CONCLUSION AND RECOMMENDATION

The study revealed that female-headed farming households in Ezza North Local Government Area rely mainly on crop farming, self-care, and petty trading as their major survival strategies, while ventures such as fish and poultry farming were utilised to a low extent. Major constraints identified include stipulated mourning periods, lack of decision-making power, male dominance, poor access to extension services, and inadequate funds, all of which limit the women's ability to diversify and sustain their livelihoods. It is therefore recommended that policies and interventions should focus on improving women's access to credit facilities, and decision-making opportunities, while also addressing socio-cultural barriers such as gender bias and restrictive mourning practices to enhance their adaptive capacity and economic resilience.

REFERENCES

Adewale, A. A., Ajani, O. I. Y., & Bello, A. M. (2021). Livelihood strategies and poverty status among rural female farmers in Nigeria. *Journal of Agricultural Extension and Rural Development,* 13(2), 67–75

Ejinkeonye, U., Ezea, I., & Chukwuone, C. (2022). Challenges and coping strategies of female headed households in Ikwuano Local Government Area of Abia State. *International Journal of Home Economics*, 15(2), 91-102.

Eze, C. A., & Nwankwo, S. I. (2020). Coping strategies among female-headed households in Southeastern Nigeria: Evidence from Ebonyi and Enugu States. *Nigerian Journal of Rural Sociology*, 21(1), 23–33.

Mezie-Okoye C.O (2021). Patriarchy and Gender Inequality in Education in Anambra State, Nigeria: A Sociological Underpinning. *Research on Humanities and Social Sciences,*11(6), 33-40

Ogunbameru, B. O., & Idrisa, Y. L. (2016). Constraints to women's participation in agricultural production in Nigeria. *Journal of Agricultural Extension*, 20(2), 78–89.

Ogunlela, Y. I., & Mukhtar, A. A. (2009). Gender issues in agriculture and rural development in Nigeria: The role of women. *Humanity & Social Sciences Journal*, 4(1), 19–30.

Okeke, D. C., & Okoye, U. O. (2019). Rural women's resilience and adaptive livelihood strategies in the face of poverty in Nigeria. *African Journal of Development Studies*, 9(4), 45–58.

Olaoye, O. A., & Ajayi, O. A. (2020). Determinants of women's access to agricultural information in rural Nigeria. *Journal of Agricultural and Rural Development*, 23(3), 55–66.

ASSESSMENT OF SAFETY MEASURES AGAINST WORK-RELATED HAZARDS AMONG WOMEN MAIZE FARMERS IN ATIBA LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT
The study explored safety measures against work-related hazards among women maize Farmers in Atiba Local Government Area, Oyo State, Nigeria. A multistage sampling procedure was used to select 120 respondents. Data on respondents' socioeconomic characteristics, work-related hazards encountered, and the safety measures taken by women farmers were collected using an interview schedule and analysed using percentages, frequency, weighted mean score, Pearson Moment Correlation, and Chi-square at $\alpha_{0.05}$. The results revealed that the mean age and years of farming experience were 41.0 years and 13.0 years, respectively. The most common occurrences of work-related hazards experienced were muscle and joint pain (WMS=2.54), sunburn (WMS=2.27), and insect stings (WMS=2.18). In contrast, use of local herbs and balm to relief body pain (WMS=1.67), wearing hats (WMS=1.09), and wearing boots (WMS=0.56) were the safety measures taken against the hazards. A significant relationship existed between respondents' age (r=-0.244), years of farming experience (r=-0.363), safety measures taken (r=-56.40), primary occupation ($\chi 2$=326.40), and the respondents' work-related hazards. Women Maize farmers encountered farming health hazards; hence, the developmental agencies should implement comprehensive health and safety programmes tailored to the specific needs of the respondents.
Keywords: Farming health hazards, safety health measures, comprehensive health programmes, developmental agencies

INTRODUCTION

Agriculture remains a cornerstone of Nigeria's economy, contributing to food security, employment generation, and the supply of raw materials for agro-industries, while also earning foreign exchange and supporting global efforts to combat hunger and poverty as outlined in SDGs 2 and 3 (Ukwani et al, 2023). Rural farming remains the dominant livelihood activity, with women playing a particularly crucial role. Studies by Ogunlela & Mukhtar (2022) and Ukwani et al, (2022) show that women constitute 60–80% of the agricultural labour force, undertaking major tasks such as planting, weeding, processing, marketing, and storage, and producing nearly two-thirds of food crops, especially maize. Despite this central contribution, agriculture remains one of the most hazardous industries globally, and rural women are disproportionately exposed to occupational health risks due to their reliance on manual labour and limited access to safety resources.

Research consistently shows that female farmers face several health challenges caused by intense physical labour, long exposure to harsh environmental conditions, and contact with hazardous agrochemicals. The National Commission on self-employed women reports high rates of posture problems, respiratory diseases, injuries, toxic exposures, and overall body pain linked to unsafe working conditions and the lack of protective equipment (Ogunlela & Mukhtar, 2022). Poor health reduces farmers' income, productivity, and sustainability, highlighting the vital link between health and agricultural progress. Therefore, this study aims to evaluate the socioeconomic characteristics of the respondents, identify the types of occupational health hazards encountered by the respondents, and examined the safety measures used by the respondents. The significant relationship between the socioeconomic characteristics of the respondents and the occupational health hazards in the study area.

METHODOLOGY

The study area was Atiba Local Government Area, Oyo State, Nigeria, with the population of the study being all women maize farmers in the study area. Data was collected with a structured questionnaire using an interview schedule. The data were analysed using percentage, weighted mean score, mean, rank, and Pearson Product-Moment correlation (PPMC) and Chi-square at α 0.05. A multistage sampling procedure was used for this study; at Stage one, a simple random sampling technique was used to select 30% of the 10 wards in the study area to give 3 wards (Agunpopo I ward, Oke Aafin II ward, and Asipa III ward) The second stage involved the use of simple random selection of 4 villages in each ward (Giving 12 villages). The third stage involved the generation of a Maize farmers' list in each of the selected villages. The fourth stage involved systematic random selection of 10 women maize farmers in the selected village. This gave a sample size of 120 respondents. The objectives of the study were measured accordingly.

RESULT DISCUSSION

Socioeconomic characteristics

The results in Table 1 revealed that the respondents were primarily farmers (83.3%), with a mean age and years of farming experience were 41.0 years and 13.0 years, respectively. This implies that

respondents were experienced, agile farmers who are in their productive years.

Table 1: Distribution of respondents according to their socioeconomic characteristics

Variable	Frequency	Percentage	Mean
Age (in years)			
20-39	55	44.0	41
40-59	36	28.8	
60 and above	29	23.2	
Primary Occupation			
Others	10	8.3	
Civil servant	2	1.7	
Trading	8	6.7	
Farming	100	83.3	
Years of experience in livelihood activities			
1-10	54	44.8	13
11-21	50	41.7	
22 and above	16	13.5	

Source: Field survey, 2023

Occupational health hazards encountered

The result in Table 2 shows that the most occupational health hazards encountered by the respondents were muscle and joint pain (WMS=2.54), sunburn (WMS=2.27), insect sting (WMS=2.27), with watering eye after chemical spraying (WMS=0.29) being the least. This implies that respondents encountered various forms of hazards while going about their livelihood activities.

Table 2: **Occupational health hazards encountered by the respondents**

Occupational hazard	Always (%)	Often (%)	Rarely (%)	Never (%)	WMS	Rank
Muscle and joint pain	58.3	38.3	2.5	0.8	2.54	1st
Sun burn	50.8	32.5	9.2	7.5	2.27	2nd
Insect sting	36.7	50.0	7.5	5.8	2.18	3rd
Laceration	20.0	54.2	19.2	5.8	1.90	4th
Watering eye after chemical spraying	0.0	5.0	22.5	75.8	0.29	20th

Source: Field survey, 2023

Safety measures used by the respondents

The result in Table 3 depicts that use of local herbs and balm to relieve body pain (WMS=1.67), wearing of hats to prevent over exposure to sun (WMS=1.09), wearing of boots to prevent cuts, snake and insect bites ranked third (WMS=0.56), and monthly medical checkup (WMS=0.18) being the least. The result implies that respondents have developed some coping mechanisms as a means to relieve the effects of the hazards encountered on their health.

Table 3: Distribution of respondents according to the safety measures used by the respondents

Variables	Always (%)	Often (%)	Rarely (%)	Never (%)	WMS	Rank
Use of local herbs and balm to relief body pain	31.7	34.2	3.3	30.8	1.67	1st
Wearing of hats to prevent exposure to sun	12.5	27.5	16.7	43.3	1.09	2nd
Wearing of boots to prevent cuts, snakes and insect bite	8.3	5.0	20.8	65.8	0.56	3rd
Monthly medical checkup	3.3	2.5	3.3	90.8	0.18	8th

Source: Field survey, 2023

Relationship between the selected variable and the occupational health hazards of maize women farmers

The result in Table 4 revealed that some of the socio-economic characteristics variables, such as age (r=0.434), household size (r=0.011), years of experience (r=0.), primary occupation (r=0.260), exhibit a significant relationship with the occupational health hazards of women farmers. The result shows that the age of respondents was

significantly different, implying that respondents in their active age tend to have good health practices towards occupational hazards faced. Years of experience of respondents is significant to the occupational health hazards faced by the respondents because the more years respondents have spent on their occupation, the more familiar, they are with avoiding necessary risks and monitoring their health.

Table 4: Relationship between the selected variable and the occupational health hazards of maize women farmers

Variables	**r-value**	
Age	-0.244*	
Household size	0.011	
Years of farming experience	-0.355*	
Safety measure index	-56.40	
Variables	**χ2 –value**	**df**
Primary occupation	326.40*	1

Source: Field Survey, 2023 *P ≤0.05 level

CONCLUSION AND RECOMMENDATIONS

Respondents' involvement in maize production across the value chain comes with health hazards such as body pain, which they mitigate by using local herbs and wearing protective gear. However, the respondents' socioeconomic characteristics influence the safety measures they adopt against job hazards. The study recommends that extension workers should educate female farmers on the importance of using primary health centers for their health issues to receive proper recommendations for suitable drugs and dosages for pain relief. It also suggests that female farmers should consistently use protective gear to prevent hazards on the field, and that developmental agencies should implement comprehensive health and safety programs tailored to the specific needs of the respondents.

REFERENCES

Ukwuani, F. A., Olowogbon, S. T., & Adebayo, O. S. (2023). Gender-specific occupational hazards in agriculture: A review of global and local perspectives. Journal of Agricultural and Environmental Ethics, 36(2), 213-229. https://doi.org/10.1007/s10806-023-09842-9

Ogunlela, Y. I., & Mukhtar, A. A. (2022). The role of women in agricultural development and occupational health risks. International Journal of Agricultural Sustainability, 20(1), 54-67. https://doi.org/10.1080/14735903.2022.2023458

ATTITUDE OF CASSAVA FARMERS TO *EGEDOLA* RADIO PROGRAMME AIRED BY OKE-OGUN FM

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ABSTRACT
The study assessed the attitude of cassava farmers towards *Egedola* radio programme aired by Oke Ogun FM. Two-stage sampling procedure was used to select 150 respondents. Data were collected using interview schedule covering respondents' socio-economic characteristics, preferred programme format, listening status, challenges and attitude of respondents towards listening to *Egedola* radio programme. Data obtained were analysed using frequencies, percentages, and Pearson Moment Correlation at p=0.05. Results indicate that 48.7% of the respondents were between ages of 46-50 years. Majority (82.7%) were male, married (92.7%), and 54.0% had secondary education, while 73.3% earned more than ₦200,000 annually. All respondents (100.0%) preferred interview with experts and call-in format, while 51.3 preferred panel discussion. Meanwhile, 82.7% had high listening status, and 69.3% had favourable attitude towards the *Egedola* radio programme. Poor power supply ($\bar{x}$= 2.99) was a major challenge to listening to *Egedola* radio programme. There was a significant correlation between challenges faced by the respondents and their attitude (r = 0.171, p=005) towards listening to *Egedola* radio programme. It is recommended that respondents should seek other energy sources like solar power to charge their radio gadget to connect to the programme.
Keywords: *Egedola* radio programme, Preferred format, Oke-ogun FM, Cassava farmers

INTRODUCTION

Agriculture is the backbone of the economy in many developing countries as it plays an important role in their economy, and in Nigeria. Over 70 percent of are engaged in the agricultural sector (FAO, 2022). It is an important source of food for the populace and foreign exchange earnings for the country. Nigeria has about 70.8 million of arable land area with maize, cassava, guinea corn, yam, beans, soybeans, groundnut, millet and rice being the most cultivated crops (FAO, 2022).

Mass media, including radio remain a veritable platform to communicate and connect with a large audience and it is also an important element to effectively transfer technologies to farmers (Anyanwu & Udoh, 2022. Radio broadcasting is a medium for disseminating information in rural communities which also remains one of the quickest and most effective ways to share important information repeatedly with rural population (Paul, 2021). Development programmes such as radio broadcast on radio stations have enormous potentials for the development of the Nigeria's agricultural sector and the rural areas with studies (Yahaya, Adamson and Kareem, 2018); Olajide and Ladigbolu 2020) establishing the yawning for radio programme by large number of rural farmers with request for allocation of more time to such programmes.

Olajide, Tijani and Ojomuyide (2020) further noted that radio is regarded as the most effective and efficient medium for disseminating agricultural information to a large number of farmers. Attitudinal changes and improvements in farmers' knowledge can be achieved by utilising the appropriate media channel, with radio being particularly advantageous. Despite the significant role of agriculture in Nigeria's economy, cassava farmers in Oyo State continue to face substantial challenges that hinder their productivity and overall agricultural development. Key issues include limited access to modern farming techniques, inadequate pest and disease management, insufficient knowledge of market trends, and poor financial literacy. These challenges are compounded by the information dissemination gap, where critical agricultural information often fails to reach the rural farmers who need it the most (Yusuf et al 2021). *Egedola* radio programme is a crop enterprise and crop specific programme focusing only on cassava unlike other agricultural radio programme like *Agbeloba* and *Arokobodunde* that focused on general farming and agriculture. It is against this backdrop that this study assessed the attitude of farmers towards listening to *Egedola* radio programme aired by Oke Ogun FM. The specific objectives of the study were to:

- describe the socioeconomic characteristics of the cassava farmers in the study area,
- identify the preferred programme formats by cassava farmers of the *Egedola* radio programme,
- investigate the challenges cassava farmers faced listening to *Egedola* radio programme,
- assess the radio listening status of cassava farmers in the study area, and
- determine the attitude of cassava farmers towards listening to *Egedola* radio programme in the study area.

The study hypothesized that there is no significant relationship between the challenges faced by cassava farmers and their attitude towards listening to *Egedola* radio programme.

METHODOLOGY

The study area for this research was Oke-Ogun. Oke Ogun is a region in Oyo State, Nigeria, situated in the Northern part of the state. The major occupation of the people in Oke Ogun is agriculture, particularly crop farming. They are known for producing crops like cassava, yam, maize, and beans. The people of Oke Ogun are predominantly Yoruba speaking, with a strong sense of community and tradition. The region has a growing economy, with opportunities in agriculture, trade, and commerce. It has a total population of 1.4 million people (National Population Commission 2006). Oke Ogun has 10 Local Government Areas (LGAs) which include Atisbo, Oorelope, Iseyin, Itesiwaju, Kajola, Irepo, Olorunsogo, Iwajowa, Saki East; Saki West. Oke Ogun FM is a popular radio station in the region, broadcasting in the local indigenous Yoruba language. It is known for its informative and entertaining programmes, including agricultural tips, news, and cultural shows.

The study population comprised all cassava farmers in Oke-Ogun area of the State. A two-stage sampling procedure was used to select cassava farmers for the study area. In stage one, a random selection of 30% of the local government areas was done resulting in the selection of Kajola, Iseyin and Itesiwaju LGAs. During stage two, a random selection of 10% of the registered cassava farmers of the Oyo State Agri Business Development Agency (OYSADA) was carried out which gave a total sample size of 150 cassava farmers for the study. Farmers' attitude (dependent variable) was measured using a 20-item statements that bothers on farmers' level of satisfaction, programme relevance, perceived usefulness, accessibility, interactivity, perceived benefits, broadcast language and level of engagement. Mean score was used to categorise respondents to favourable and unfavourable attitudinal disposition.

A structured questionnaire, administered as an interview schedule was used for data collection Data collected was analysed using frequencies, percentages, mean and Pearson's correlation analysis at p=0.05.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results in Table 1 reveals that majority (82.7%) of the respondents were male implying that cassava farming is male dominated in the study area. This finding is consistent with the assertions made by Doss et al, (2020) that men dominate farming practices globally. Less than half of the respondents (48.7%) were within the age range of 46-50 years with the mean age of 48.01 $\pm$ 5.274 years. This implies that majority of the respondents are young adults who possess the strength, interest and ability to process agricultural information. This corroborates the findings of Metouole *et al.*, (2018) that younger farmers have better opportunities to access farming information and open to innovation. The result further shows that 60.7% of respondents were Christian and 34.7% of respondents were Muslim. This means that the respondents are affiliated to at least one of the dominant religions in the study area. Majority (92.7%) of the respondents were married, implying that most of the respondents are family oriented. Table 1 further reveals that most (73.3%) of the respondents earned between ₦200,000 and ₦400.000 annually from their Cassava production enterprise with an average annual income of ₦367,466.67 with majority (54.0%) having secondary education. The reasonable quantum of educated respondents could probably have influenced their farm practice which consequently impacted on their income. Most (74.0%) of the respondents had 6-10 persons in their households as family members. This implies that most farmers in the study area have a relatively large family size. This is corroborated by the findings of Oyedele et al (2020) that larger family size is associated with more conservative attitude towards adopting new agricultural practices disseminated through radio programmes. Most (74.0%) of the respondents have 6-10 years' experience in cassava production, suggesting that most of the cassava farmers have been in the cassava enterprise for some time. This is in line with the findings of Arouna et al (2020) that high farming experience is the driver for seeking and adoption of sustainable agricultural innovation. Respondents' farm sizes in acres indicate that 58.1% of respondents had 1-5 acres of farmland. This implies that most respondents have average farm size. All the respondents (100.0%) had access to radio set. This makes listening to *Egedola* radio programme easy with likelihood of having access to up-to-date information on Cassava production activities, as the programme specifically targeted all activities in the Cassava value chain, including, production, processing, value addition and marketing.

Preferred radio format by cassava farmers

Preferred radio formats are presented in Table 2. Results reveal that all (100%) of the respondents preferred interview with experts and call-in shows, while 51.3% preferred panel discussion This corroborates the findings of Ojomo and Odigie (2017) who identified key radio formats like interviews with experts, call-in shows and panel discussion as best for delivering messages in radio agricultural information broadcast. These methods effectively address the needs of the farmers by providing direct access to information and allowing for immediate feedback. However, 78.0% of the respondents had a low preference for success stories as well as demonstration and explanation formats

(48.0%). Overall, the findings highlight a clear inclination towards interviews, call in shows and panel discussion among cassava farmers with lower interest in success stories and demonstration and explanation formats.

Table 1. Socioeconomic characteristics of the respondents (n=150)

Variables	Frequency	Percentage (%)	
Gender			
Male	124	82.7	
Female	26	17.3	
Age			
31-35	4	2.7	
36-40	13	8.7	Mean = 48.01
41-45	24	16.0	
46-50	73	48.7	
51-55	22	14.7	
56-60	14	9.3	
Religion			
Christian	91	60.7	
Islam	52	34.7	
Traditional	7	4.7	
Marital Status			
Single	4	2.7	
Married	139	92.7	
Divorced	4	2.7	
Widowed	3	2.0	
Average annual income			
200000-400000	110	73.3	
401000-600000	20	13.3	Mean=367466.67
601000-800000	20	13.3	
Education qualification			
No formal	35	23.3	
Primary	28	18.7	
Secondary	81	54.0	
Tertiary	6	4.0	
Family size (person**)**			
1-3	4	2.7	
4-6	143	95.3	
7-9	3	2.0	
Years of Farming Experience (years**)**			
1-5	3	2.0	
6-10	111	74.0	
11-15	36	24.0	
Farm size(acres)			
1-5	87	58	
6-10	44	29.3	Mean= 5.6 acres
10-15	19	12.7	
Access to radio set			
Yes	150	100.0	

Source: Field Survey, 2024

Table 2: Preferred Radio Format by Cassava Farmers

Programme Format	Highly Preferred	Preferred	Lowly Preferred	Not Preferred
Interview with expert.	150(100)	0.0	0.0	0.0
Call in Shows.	0.00	150(100)	0.0	0.0
Success Stories.	5(3.3)	28(18.7)	117(78.0)	0.0
Demonstration & Explanation.	12(8.0)	66(44.0)	72(48.0)	0.0
Panel Discussion.	62(41.3)	77(51.3)	11(7.3)	0.0

Source: Field survey, 2024

Listening status of cassava farmers to *Egedola* radio programme

The results in Table 3 indicate that most (82.7%) of the respondents were active listeners, 68.7% always listened to the programme, and 84.7% used phone calls as a feedback mechanism for the *Egedola* radio programme. Also, 73.3% of the respondents listened to the programme to get information on cassava farming, 63.3% listened mostly for 50 minutes and 86.7% use traditional radio sets to listen to the programme. This implies that agricultural information is the major drive that propelled farmers to listen to *Egedola* radio programmes. This aligns with the findings of Busch *et al., (2020)* who reported that radio programmes tailored to farmers' needs like the *Egedola* radio programme have gained significant listenership in agricultural communities globally. This indicates that such programmes effectively address farmers' interests and provide valuable information, making them a popular medium for agricultural communication and information dissemination.

Table 3: Listening status of cassava farmers

Listening status	Frequency	Percentage (%)
Engagement level		
Active listeners	104	82.7
Passive learners	46	30.7
Frequency of listening		
Seldomly	27	18.0
Occasionally	20	13.3
Always	103	68.7
Feedback mechanism		
Calls	127	84.7
Social media	23	15.3
Purpose of listening		
Entertainment	31	20.7
Education	9	6.0
Information on cassava farming	110	73.3
Listening duration		
20 min	30	20.0
30 mins	16	10.7
40 mins	9	6.0
50 mins	95	63.3
Device used to listen		
Traditional radio	130	86.7
Streaming apps	1	0.7
Online services	19	12.7

Source: Field Survey, 2024

Challenges faced by cassava farmers in listening to *Egedola* radio broadcast

The result in Table 4 reveals that cassava farmers in the study area faced several challenges that encumbered them from listening to the *Egedola* radio programme. Major challenges faced by the respondents in listening to *Egedola* radio programme were poor power supply ($\bar{x}$= 2.99), short duration of the programme ($\bar{x}$= 2.93), bad signal (($\bar{x}$= 2.87), odd broadcast hour ($\bar{x}$= 1.91), frequently repeated past edition ($\bar{x}$= 2.63), time of broadcast ($\bar{x}$= 2.79), and poor feedback ($\bar{x}$= 2.19). This corroborates with the findings of Yusuf et al (2021) who identifies power supply as a major barrier to accessing agricultural radio programmes.

Table 4: Challenges faced by cassava farmers

Challenges	Very Severe	Severe	Mild	Not a Challenge	Mean	Rank
Poor power supply	99.3	0.7	0.0	0.0	2.99	1st
Short duration of programme.	93.	6.7	0.0	0.0	2.93	2nd
Bad signal	87.3	12.7	0.0	0.0	2.87	3rd
Time of Broadcast.	79.3	20.0	0.7	0.0	2.79	4th
Frequently Repeated Edition.	64.0	35.3	0.00	0.7	2.63	5th
Poor Feedback.	24.7	70.0	5.3	0.0	2.19	6th
Odd broadcast time	8.0	74.7)	17.3	0.0	1.91	7th
Language Barriers	0.0	0.0	2.7	97.3	0.03	8th

Source: Field survey, 2024

Attitude of cassava farmers towards *Egedola* radio programme aired by Oke-Ogun FM

The *Egedola* radio programme seems to have resonated very well with majority of the cassava farmers who served as the respondents for this study. Across issues addressed and the tune or direction (positive and negative) of the attitudinal statements, farmers were favourably disposed to listening to the radio programme. Two issues (relevance and level of satisfaction) will suffice to buttress this observation. On the issue of relevance, farmers were unequivocal to observing that the programme provides valuable content (100.0%) and that it has brough positive changes in terms of quality information on agricultural practices, especially cassava production (100.0%). In the corollary, they averred to insinuation that information disseminated on *Egedola* radio programme is not easy to implement (88.6%). On the level of satisfaction, they disagreed mostly with the fact that the radio programme has not improved their level of production (100.0%) as well as the fact that the radio programme is boring (90.0%). Instead, the agreed that the radio programme has helped considerably to boost the sales of cassava produce (98.7%). It can then generally be concluded that the radio programme is well received amongst the cassava farmers' audience that the programme targeted. In the final analysis, overwhelming majority (92.6%) had favourable attitude towards listening to *Egedola* radio programme aired by Oke-Ogun FM. This aligns with the research of Busch *et al.,* (2021) in their study that examined the impact of interactive radio programming on farmers' livelihood in Uganda. The farmer audience of this programme in Uganda had a favourable attitude towards radio programmes that provide practical information, expert advice and address their specific challenges.

Table 5: Distribution of cassava farmers by their attitude towards *Egedola* radio programme aired by Oke-Ogun FM (n=150)

Statements	A	U	D
The *Egedola* programme is aired at odd hours of the day.	0.7	10.7	88.6
E*gedola* radio programme lacks opportunity for listeners' feedback.	0.0	2.0	98.0
Information disseminated on *Egedola* radio programme is not easy to implement.	1.3	10.0	88.6
I don't watch *Egedola* radio programme because it competes with my leisure time.	0.0	12.7	87.3
I prioritize my leisure time, but I make an effort to watch *Egedola* Radio Programme because provides valuable content.	100.0	0.0	0.0
The *Egedola* radio programme is not relevant.	0.0	0.0	100.0
The language used to air *Egedola* radio programme seem comfortable to me	100.0	0.0	0.0
Egedola radio programme brings positive change to agricultural practices.	100.0	0.0	0.0
Over the years, the *Egedola* radio programme has helped considerably to boost the sales of cassava produce.	98.7	1.3	0.0
The airing time of *Egedola* radio programme is comfortable to me.	100.0	0.0	0.0
Egedola radio programme is boring.	0.0	10.0	90.0
Information disseminated on *Egedola* radio programme are practice able.	100.0	0.0	0.0
The *Egedola* radio programme has not improved my level of production.	0.0	0.0	100.0
Over the years *Egedola* radio programme has had a little impact on boosting my sales of farm produce	0.7	0.0	99.3
There are no feedback opportunity on *Egedola* radio programme	0.0	0.7	99.3
I derive satisfaction when listening to *Egedola* radio programme.	100.0	0.0	0.0
I gain more knowledge when listening to *Egedola* radio programme.	100.0	0.0	0.0
Egedola radio programme has not brought any change towards agricultural practices.	0.0	0.0	100.0
The *Egedola* radio programme has helped reduce pest and diseases infestation on my farm.	100.0	0.0	0.0
Language used to air *Egedola* radio programme seem difficult to understand.	0.0	0.0	100.0

Overall attitudinal disposition to listening to Egedola radio programme

Disposition categories	Frequency	Percent
High	139	92.6
Low	11	7.4

Test of relationship between the challenges faced by cassava farmers and their attitude towards listening to *Egedola* radio programme.

Findings in Table 6 reveal a significant relationship between challenges faced by cassava farmers and their attitude towards listening to

Egedola radio programme (r = 0.171, p=0.037). This implies as challenges faced by Cassava farmers increase, farmers' attitude towards listening to *Egedola* radio programme increases. This is plausible against the backdrop of general and specific positive disposition to issues raised around their attitude towards the radio programme as reported earlier. The lesson one can draw from this trend of results is that as long as target of interventions derive some level of satisfaction in any development initiative, they will long accessing it in spite of all barriers and impediments. Findings by Leeuwis (2024) found that farmers who faced more constraints in terms of access to resources and markets were more likely to participate in extension services, including radio programme.

Table 6: Pearson Product Moment Correlation analysis showing the relationship between respondents' challenges faced by cassava farmers and their attitude towards listening to *Egedola* radio programme

Variable	r-value	p-value	Decision
Challenges faced	0.0171	0.037	Significant

+ve significant P<0.05

CONCLUSION AND RECOMMENDATIONS

From the findings reported it can be concluded that cassava farming in the study area is male dominated by young adults who are mostly Christians, married, with small farm size and corresponding low annual income. The audience of the Egedola radio programme are active listeners who mostly prefer interview with expert and call-in show format. Though, the farmer audience of the *Egedola* radio programme have favourable disposition to listening to the radio programme, they are impeded by erratic and poor power supply. This, however, does not impact negatively on their general enthusiasm expressed towards the radio programme. On the strength of these conclusions, it is suggested that the power situation should be improved upon by government at subnational and local level, while farmers continue to explore alternative power supply to maintain contact with the programme, they expressed so much enthusiasm towards.

REFERENCES

Anyanwu, B and Udoh G. N (2022). The effectiveness of mass media in agricultural extension and development. *African Journal of Agricultural Science and Food Research* 3(1), 25-36

Arouna, A., Del Villar, P, M., & Demont, M. (2020). Factors Influencing Apotion of Sustainable Farming Practices in Europe: *A Systemic Review of Empirical Literature. Sustainal6bility*, 12(22), 9719. https://doi.org/10.3390/su12229719

Busch, G, Are A., & Bell, A. (2021). Improving Farmers Livelihood through Interactive radio programming in Uganda. *Development in practice,* 31(3), 333-346.

Doss, C., Meinzen-Dick, R., Quisumbing. & Theis, S.(2020). Gender Matters*: Climate Change, Gender Bias and Women's Farming in the Global South and North. Agriculture,* 10(7), 267.

Food and Agricultural Organization *State Food and Agriculture (FAO)* (2022*)*

Leeuwis, C. (2024): Communication for rural innovation: Rethinking agricultural extension Blackwell science.

Metouole, E. S., Makwara, T. K., & Monyo, M. (2021). Influence of Socio- Economic Factors on Attitude of Smallholder Farmers towards Radio Agricultural Extension Services in Zimbabwe. J*ournal of Agricultural Extension and Rural Development, 13(1), 32-40.*

Ojomo, O., & Odigie, J. D. (2020). Formats of Radio Stations Agricultural Information Dissemination Among Cassava Farmers in Nigeria. *International Journal of Development Strategies in Humanities Management and Social Sciences*, 10(1), 1-10

Olajide B. R., and Ladigbolu T. A. (2020). Inclination to Sponsorship of Agricultural-based Soap Opera among Product Advertisers in Southwest Nigeria. *Nigerian Journal of Agricultural Extension* Vol. 21 (2): 26-34

Olajide B. R., Tijani S. A. and Ojomuyide T. O. (2020). Training Needs of Communication Officers of Agricultural and Rural Development Agencies for Entertainment-Education Script Writing in Southwestern Nigeria. *Moor Journal of Agricultural Research* Vol. 21 101-113

Oyedele O. A, Adewunmi, A.O, Ogunleye, O.O, (2020). Family Size and Farmer's Attitude towards Agricultural Information in Nigeria, *Journal of Agricultural Extension and Rural Development, Vol. 12 (1), 1-9*

Paul, A. O. (2021): The Prospects and Challenges of Online Broadcasting in Nigeria: A Case Study of Asking Radio 98.5 FM, Makurdi *SSRN. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3725966.*

Yahaya M. K, Adamson F. A., and Kareem I. T. (2018). Coverage of Agricultural Programmes in Broadcast Stations in Oyo

State. *Journal of Agricultural Extension* 22(3); 22-30.

Yusuf, S. K., Adio, E. O., Zwalmam, S. Z., & Suberu, S. B. (2021). Challenges in Accessing Agricultural Information Sources and Services by Farmers in Edu Local Government Area of Kwara State. *Library Philosophy and Practice (e-journal), 6192.*

EFFECT OF SOCIAL CAPITAL ON HOUSEHOLD FOOD SECURITY IN IJEBU NORTHEAST LOCAL GOVERNMENT AREA OF OGUN STATE

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ABSTRACT

This study examined the effect of social capital on the food security status of agrarian households in Ijebu North-East Local Government Area of Ogun State, Nigeria. A multistage sampling procedure was used to select 108 respondents, who were administered structured questionnaires. Data were analysed using descriptive statistics (frequency counts, means, and percentages) and inferential methods, specifically multiple linear regression. The hypothesis was tested at a 10% significance level. Findings revealed that the average age of respondents was 39 years, with 14.8% classified as elderly. The majority were married (62.0%) and Christians (73.1%), and 43.5% had completed secondary education. In terms of occupation, 43.5% were self-employed, and 50% had a family size of four to six persons. About 53.7% of households were mildly food insecure, 16.7% severely food insecure, and 29.8% food secure. Regression analysis showed that income ($\beta = 0.0005$, $p = 0.034$) and linking social capital ($\beta = 0.587$, $p = 0.050$) significantly influenced food security outcomes. The study concluded that Households with higher incomes and stronger external social networks experienced lower levels of food insecurity. These findings underscore the importance of fostering income-generating opportunities and enhancing exploiting social linkages to improve food security in rural agrarian setting.

INTRODUCTION

Social capital is one of the vital tools that aids individuals, organizations and even nations change status and upgrade into something greater both socially and economically. In sub-Saharan Africa, social capital could be seen as the rules, norms, obligations, reciprocity and trust embedded social relations, social structures and society's institutional arrangements, which enable members to achieve their individual and community objectives (Adam et al,2003). For most countries in sub-Saharan Africa that has been ravaged by wars and one of the deadliest epidemics recorded in history, Ebola, social capital, was one of the vital tools that helped them overcome the epidemic. Utilisation of bonding among family members helped them take care of their sick, but this was not so at the beginning as there was a lot of misinformation about the epidemic which led to the breaking of the bonds within the communities. The relationship between themselves and the outside world and resilience helped them break the barrier and annihilate the epidemic.

Some of the households, who have small scale businesses, fund the business themselves, which many times, will not help to solve the case of hunger and food scarcity. This happens because of the individuals not having the knowledge of leveraging on the bonding aspect of social capital. As the study progresses, we will get to see other aspect of social capital even in rural areas of Nigeria. Communal al., in 2019 asserted that there was a need for participation in communal development by individuals and families in a community as this helps to develop ties with members of community.

Social capital can be explained as a set of shared values or resources that allows individuals work together in a group to effectively achieve a common purpose. Furthermore, social capital could be defined as the potential ability of the individual, group, or organizations to obtain resources, favours or information from their personal connections.

With social capital being instrumental in the well-being of people, groups and organizations, it can be classified into three types, i.e. bonding capital, bridging capital and linking capital. Bonding social capital is a type of social capital that describes connections within a group of community characterized by high levels of similarity in demographic characteristics, attitudes and available information and resources. It is a relationship that develops between people of similar background and interest, and it includes family and friends who provide material and emotional support. Bridging social capital describes connections that link people across a cleavage that typically divides society (such as race, class, or religion). It is associations that ' bridge' between communities, groups, or organizations. In bridging, different groups tend to share and exchange information, ideas, and innovation, building consensus among the groups representing diverse interest. Bridging functions as a social lubricant and has a potential to work as leverage, to help one “get ahead” (Putnam 2000); it is mostly inclusive and consist of a thin trust in light and ever-changing networks. The third type of social capital is linking. It helps to describe the norm of respect and networks of trusting relationships between people who are interacting across explicit formal or institutionalized power or authority gradient in society (Szreter and Woolcock, 2004) could be viewed as an extension of bridging social capital involving networks and ties with individuals, groups or corporate actors represented in public agencies, schools, business interest, legal institutions and religious/ political groups (Healy, 2002). Some authors have also found connections between high levels of linking social capital and

nepotism, corruption, and suppression (Szreter and Woolcock, 2004).

Food insecurity does not only describe the lack of food (quantity) but talks about absence of food in quality which could cause malnutrition and chronic hunger. In other to reduce these negative effect, social capital (bonding, bridging, and linking) needs to be considered.

The general objective of the study is to investigate the effect of social capital on household food security in the study area.

The specific objectives are to:

1. Describe the socioeconomic characteristics of rural dwellers in Ijebuode local government area;
2. To determine the household food security status of the study area.

METHODOLOGY

A multistage sampling procedure was used to select respondents from the agrarian communities of the Ijebu northeast local government area of Ogun state. Out of the ten wards in the Ijebu north-east L.G.A. Random sampling was used in selecting five communities in the study area at the first stage. The communities that were selected includes Ilese, Erunwon, Itamarun, Isonyin and Odonselu. The simple random sampling was also used to select a total of 108 households from the five communities

Primary data was collected for this study using structured questionnaire was developed and administered to elicit information on socioeconomic characteristics and assess the social capital status of rural households in the study area, while descriptive statistical tools such as frequency distribution, percentages and mean was used in presenting data while inferential statistical tools such as Pearson Product Moment Correlation (PPMC) will be used in testing hypotheses.

RESULT AND DISCUSSION

Socioeconomic characteristics

According to the result presented in Table 1, the mean age of the respondent is 39 years.

Table 1: Distribution of respondents by socioeconomic characteristics (n = 108)

Variables	Frequency	Percentage	Mean	SD
Age (Years)				
Less or equal to 20	4	3.7		
21-30	27	25.0		
31-40	31	28.7	39.05	11.27
41-50	27	25.0		
51-60	16	14.8		
Greater than 60	3	2.8		
Sex				
Male	47	43.5		
Female	61	56.5		
Marital status				
Single	29	26.9		
Married	67	62.0		
Divorced	2	1.9		
Widowed	6	5.6		
Separated	4	3.7		
Educational level				
No-formal	4	3.7		
Primary	17	15.7		
Secondary	47	43.5		
Tertiary	40	37.0		
Household size				
≤ 3	29	26.9		
4-6	54	50		
7-9	22	20.4		
> 9	3	2.8		
Income [in Naira]				
≤ 20000	23	21.3	45,961	
21000-40000	42	38.9		
41000-60000	21	19.4		
61000-80000	8	7.4		
> 80000	14	13.0		
Any other occupation				
No	77	71.3		
Yes	31	28.7		

This indicates that most of the respondents are adults and were in their economically active stages of their lives. It was also indicated in the table that the mean income of the respondents is 45,961.0 Naira. In Nigeria, currently having a minimum wage of 30000 naira, it is important to note that the respondents cannot cater fully for their needs with the monthly income they earn. The majority (56.5%) of the respondents were females, with most (62.0%) of the respondent being married. This indicates that most of the people who live in the rural household are married and have a sense of responsibility to ensure that family has a better standard of living. This helps the married provide available and accessible food for the family. Also, 50% of the respondents have a family size between 4-6. Also, close to half (43.5%) of the respondent of the population had secondary education, while 43.5% of the respondents were self-employed which shows that close to half of the respondent were economic active. However, 71.3% had no other occupation asides from what they engaged in that served as a source of income to them.

Household food security status of the study area

The chart below shows the percentages of the food insecurity status of the respondents in the study area. The result of the categorization of food insecurity status is divided into “not food insecure” mildly food insecure and” severely food insecure”.

The chart further shows that 16.7% of the respondents were severely food insecure. This means that lesser part of the respondents does not eat well. This is because of their finance not being sufficient to provide food. 29.6% of the respondents were not food insecure. This means that a considerable number of people had access to food hence them not being hungry. It also explains that such households can meet their dietary needs while 53.7% of the respondents were mildly food insecure. This further explains that that many of the households still experience food insecurity to a considerable extent. They are unable to meet their dietary needs even when they find certain substitutes to alleviate hunger. This finding was also corroborated by Obayelu and Oyekola (2018) where they found out that 80.9% of the population among urban slum households were food insecure.

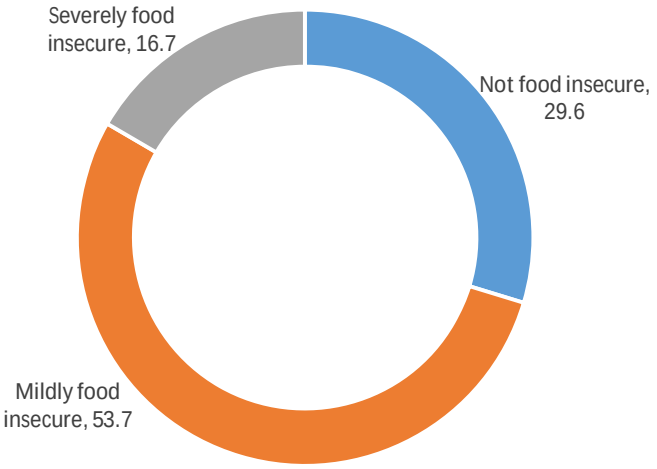

Figure 1: Food insecurity status of households (%)

However, there is a significant relationship between income (β = 0.0005), linking (β=-0.587) and food insecurity. Table 2 shows that income can greatly influence the level of food insecurity in the rural areas. Earning a salary that is high enough will help to ensure that the household heads purchase quality food in quantity, ensuring that the household is not hungry, meeting their dietary requirements.

Table 2: Linear regression to test for relationship between food insecurity and socioeconomic characteristics

Variables	Std. error	Standardised coefficients (β)	t-value	p-value
(constant)	4.517		4.998	0.000
Age	0.061	-0.096	-0.902	0.370
Income	0.000	-0.239	-2.154	0.034
Household size	0.312	0.160	1.458	0.148
Sex (male=1, otherwise=0)	1.252	0.026	0.269	0.789
Marital status (married=1, otherwise=0)	1.435	0.074	0.685	0.495
Formal education (secondary education=1, otherwise=0)	3.213	-0.180	-1.901	0.060
Religion (Christian=1, otherwise =0)	1.424	-0.093	-0.939	0.350
Occupation (farming=1, otherwise=0)	2.701	0.126	1.215	0.228
Secondary occupation	1.402	-0.026	-0.260	0.796
Bonding	0.029	0.045	0.480	0.632
Bridging	0.341	0.208	1.847	0.068
Linking	0.301	-0.201	-1.949	0.050
Benefits of bonding	0.334	-0.202	-1.785	0.078
Benefits of bridging	0.375	-0.174	-1.285	0.202
Benefits of linking	0.296	0.040	0.318	0.751

$R=0.557$, $R^2=0.310$

CONCLUSION

The concept of social capital in this age and time goes beyond how the world new its years ago. It can be explained as a concept that is concerned with developing ties and relationships beyond one's immediate circle with the aim of improving one's standard of living in the long run. Social capital describes relationships with family friends and associates as that which can be depended on in the times of crisis, enjoyed and leveraged on for the material gain.

Some authors are of the opinion that social capital is the stock of trust, networks and values that people can draw upon in order to improve their livelihoods and to pursue shared objectives. Social capital is said to be based on 'what you know" rather than on "who you know".

REFERENCES

Adam, F., Roncevic, B. (2003). Social capital: Recent debates and research trends. *Social Science Information*, 42(2), 155–183.

Adekoya, A. E. (2018). Food insecurity status of rural households during the post-planting season in Nigeria. *Journal of Agriculture and Sustainability*, 4(1), 16–35

Healy, T. (2002). The role of social capital in the process of economic development. *Journal of Economic Issues*, 36(1), 49-74.

Obayelu, A. E., & Oyekola, O. S. (2018). Food insecurity among urban slum households in Nigeria. *Journal of Development and Agricultural Economics*, 10(5), 122-133

Putnam, R. D. (2000). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 64-78.

Schmeer, K., & Mendez, M. (2015). Maternal resources and food security in urban slum households. *Food Security*, 7(2), 1-16.

Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory and the political economy of public health. *International Journal of Epidemiology*, 33(4), 650-667.

Yusuf, A., Adepoju, A. O., & Oni, A. (2019). Community participation and social capital in rural development. *Journal of Rural Studies*, 68, 1–10.

USE OF DIGITAL FINANCIAL SERVICES AMONG SMALLHOLDER FARMERS IN NORTH CENTRAL NIGERIA

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ABSTRACT

Agriculture is a major contributor to Nigeria's economy, yet smallholder farmers continue to face financial exclusion, limiting their access to credit, savings, and risk management tools. Digital Financial Services (DFS) offer significant potential to bridge this gap, but adoption remains low among farmers in North Central Nigeria. The study investigated the use of Digital Financial Services among smallholder farmers in North Central Nigeria. This study assessed the types of DFS used and identified constraints hindering adoption. A multistage sampling procedure was employed to select 812 respondents across Kogi, Kwara, and Niger states. Data were analysed using descriptive statistics and Pearson Product-Moment Correlation analysis. Results revealed that Point of Sale (POS) devices (90.4%) and Automated Teller Machines (90.3%) were the most commonly used DFS tools, followed by debit/credit cards (81.0%). In contrast, mobile/Internet banking (58.3%) and e-wallets (43.8%) recorded lower levels of adoption. Major barriers identified include transaction failures (23.3%), fear of sending money to the wrong account (14.7%), and poor network access (13.2%). Correlation analysis revealed a weak but significant positive relationship between constraints and adoption ($r = 0.223$, $p < 0.001$), indicating that active users are more susceptible to system inefficiencies. The findings underscore the need for enhanced digital infrastructure to mitigate transaction failures, and the implementation of targeted digital literacy campaigns that address concerns about fraud and hidden charges.

Keywords: Digital financial services, smallholder farmers, financial inclusion, Point of Sale (POS) devices and Automated Teller Machines

INTRODUCTION

Agriculture serves as a cornerstone of Nigeria's economy, contributing 21% to its Gross Domestic Product (CGAP, 2017). Despite the significance of oil exports, agriculture remains the foundation of Nigeria's economy, providing livelihoods for 36.5% of the entire labor force and consistently contributing 21% to GDP, despite recent economic fluctuations. In Nigeria, smallholder farmers, which officially have less than five hectares of land, play a significant role in the agricultural sector, accounting for more than 70% of the farming output and providing a source of livelihood for millions of individuals (Abdulraheem and Yusuf, 2021). In recent years, Digital Financial Services (DFS) have emerged as a transformative tool for enhancing financial inclusion and improving the economic resilience of smallholder farmers, particularly in developing regions. In North Central Nigeria, smallholder farmers face numerous challenges that hinder their ability to access financial resources, adopt modern farming techniques, and drive productivity improvements. Despite the proliferation of mobile phones and the widespread availability of digital payments, the use of DFS among these farmers remains relatively low, prompting critical inquiries into the underlying constraints that impede their engagement with digital finance.

DFS can streamline agricultural transactions, improve access to markets, and facilitate timely receipt of payments, thus enabling farmers to make informed financial decisions (Khan et al., 2020). DFS can help mitigate common risks associated with farming, such as crop failure or price volatility, thereby contributing to better livelihood security and higher agricultural productivity (Zins & Weill, 2022).

The primary objective of this study is to assess the use of digital financial service among smallholder farmers in Nigeria. Specifically, the study aims to:

1. identify the types of DFS used to smallholder farmers in the study area.
2. identify the constraints to usage of DFS among smallholder farmers in the study area

Hypothesis of the study was stated that constraints associated to using DFS do not significantly affect the adoption of DFS among smallholder farmers.

METHODOLOGY

The study was conducted in North Central Nigeria. North Central Nigeria. A multi-stage sampling procedure was used to select 812 respondents for the study.

RESULTS AND DISCUSSION

Type of DFS used by the farmers

Table 1 details the types of Digital Financial Services (DFS) used by respondents. It provides valuable insights into the extent of use of various

DFS platforms among farmers. The frequency of usage across these services reveals patterns in digital financial behavior, highlighting which tools are most accessible or preferred, and which are less utilised, possibly due to technological, infrastructural, or knowledge-based barriers. The most widely used DFS tools among the respondents are Point of Sale (POS) systems and Automated Teller Machines (ATMs). POS devices are used by 90.4% of respondents, while 90.3% use ATMs. This high adoption rate reflects the mainstream nature of these services

Table 1: Type of DFS used by farmers

S/N	Digital Financial Service Used	Yes	No	Mean (SD)	Rank
		Freq. (%)	Freq. (%)		
1.	POS	734 (90.4)	78 (9.6)	0.904(0.2)	1st
2.	ATMs	733 (90.3)	79 (9.7)	0.903(0.2)	2nd
3.	Cards	658 (81.0)	154 (19.0)	0.810(0.3)	3rd
4.	Internet and mobile banking	473 (58.3)	339 (41.7)	0.583(0.4)	4th
5.	E-Wallets	356 (43.8)	456 (56.2)	0.438(0.4)	5th

Source: Field Survey, 2024

Constraints to DFS Adoption

This section investigated the relationship between the Constraints to use of DFS and smallholder farmers' adoption of DFS. The Pearson Product Moment Correlation analysis in Table 2 showed a positive and statistically significant association between the constraints faced by farmers in using digital financial services (DFS) and their adoption use score ($r = 0.223$, $p < 0.001$).

This finding appears counterintuitive, as one would typically expect that constraints would act as barriers, thereby reducing adoption levels. However, it could imply that farmers who have adopted DFS are more aware of, and report, the challenges inherent in its usage because of their direct experience. In contrast, non-users or low adopters might not have encountered these constraints simply because they have not engaged significantly with DFS platforms. This aligns with the notion that adoption exposes users to system limitations, operational challenges, and service inefficiencies that may not be visible to non-users (Akinwale & Kyari, 2020).

Table 2: Correlation analysis between the constraints and adoption of DFS

Variables	r-value	p-value	Remark	Decision
Constraints to using DFS	0.223	0.000	S	Reject Null

Source: Field Survey, 2024

S at $p \leq 0.05$, r – Correlation coefficient, p – probability coefficient, S – significant, NS –not significant

CONCLUSION AND RECOMMENDATION

The study shows that Point of Sale (POS) is the most used DFS among the smallholder farmers. Correlation analysis revealed a weak but significant positive relationship between constraints and adoption, indicating that active users are more susceptible to system inefficiencies.

The study recommends the following:

1. There is a need to strengthen digital infrastructure and expand network coverage in rural communities where smallholder farmers reside. Improved access to stable mobile and internet connectivity will ensure seamless access to DFS platforms, reducing transaction failures and boosting confidence in digital channels.
2. Continuous and inclusive digital financial literacy campaigns should be implemented, focusing on demystifying DFS usage, building trust, and addressing fears related to fraud and hidden charges. Such sensitization efforts should involve trusted intermediaries such as agricultural extension agents, cooperative societies, and local community leaders.

REFERENCES

Abdulraheem, A. A., and Yusuf, A. O. (2021). Smallholder farmers and digital financial inclusion in Nigeria. *Journal of Economics and Sustainable Development*, 12(3), 93-104.

Akinwale, Y. O., & Kyari, A. K. (2020). Factors influencing attitudes and intention to adopt financial technology services among the end-users in Lagos State, Nigeria. *African Journal of Science, Technology, Innovation and Development*, *14*(1), 272–279. https://doi.org/10.1080/20421338.2020.1835177

Consultative Group to Assist the Poor (CGAP). (2018). The Role of Digital Financial Services in Financial Inclusion. Retrieved from https://www.cgap.org/research/publi

cation/role-digital-financial-services-financial-inclusion

Khan, M. A., Shah, A., & Khan, A. (2020). Financial Access and Economic Resilience of Farmers in Developing Countries: Evidence from Pakistan. *Agricultural Finance Review*, *80*(2), 222-237. https://doi.org/10.1108/AFR-01-2020-0014

Zins, A., & Weill, L. (2022). The Role of Digital Financial Services in Promoting Financial Inclusion: Evidence from Sub-Saharan Africa. *World Development*, *154*, 105865. https://doi.org/10.1016/j.worlddev.2021.105865

DIGITAL COMMUNICATION TOOLS UTILISATION BY POULTRY FARMERS IN OGUN STATE, NIGERIA

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ABSTRACT
Digital Communication Tools (DCTs) are increasingly transforming agricultural production by improving information flow, farm management and market access. This study assessed poultry farmers' utilisation of DCTs in Ogun State, Nigeria, highlighting their perception, extent of DCTs use and associated challenges. A two-stage sampling procedure was employed to select 120 respondents. Data were collected using a well-structured questionnaire and analysed using descriptive statistics (percentages, frequency counts and mean and Pearson Product Moment Correlation. Respondents had a mean age of 43 ± 9.55 years, a household size of 6 ± 2.20 persons, and 11 ± 4.69 years of formal education. Findings reveal that more than half (60.7%) of the respondents had favourable perceptions of DCTs use. The extent of DCTs use was low among 59.2% of respondents while a majority (64.9%) experienced a high level of constraints in their use. The major constraints identified were high service costs ($\bar{x}$ = 1.58), erratic power supply ($\bar{x}$= 1.26), high initial investment in digital tools ($\bar{x}$= 1.24) and limited internet access ($\bar{x}$= 1.01). Correlation analysis showed that age (r = –0.284) household size (r = 0.011) and years of education (r = 0.052) were significantly related to the extent of DCT utilisation for poultry production. Enhancing poultry farmers' utilisation of DCTs requires affordable services, reliable electricity, financing support and rural internet. Government and agricultural organisations should address these gaps through targeted interventions to reduce adoption constraints and strengthen digital tool use in poultry production.
Keywords: Digital communication tools, Poultry farmers, Adoption constraints, Agricultural innovation

INTRODUCTION

Nigeria's agriculture is a key sector supporting livelihoods, employment, food security, and economic growth (Adamaagashi *et al.*, 2023). Poultry farming, in particular, provides a critical source of protein and income for rural communities. The sector has expanded due to rising demand, urbanisation, and changing diets (Birhanu *et al.*, 2022). Despite its importance, challenges such as disease outbreaks, poor infrastructure, market access limitations, and reliance on traditional practices constrain productivity (Ekiri *et al.*, 2021).

Modernisation through improved breeds, better management practices, and technology adoption has become essential for efficiency and competitiveness (Otunaruke *et al.*, 2023). Digital Communication Tools (DCTs), including mobile apps, websites, and social media, offer farmers real-time information on market prices, weather, pest management, and best practices, enabling collaboration across the agricultural value chain (Akinwale *et al.*, 2023).

In Nigeria, where traditional extension services are limited, DCTs can bridge information gaps and empower farmers, yet research on their adoption in poultry farming remains scarce (Olanrewaju *et al.*, 2021). This study investigates DCT utilisation among poultry farmers in Ogun State, examining perceptions, extent of use, constraints, and the relationship between farmers' socioeconomic characteristics and DCT adoption.

METHODOLOGY

Ogun State, in southwestern Nigeria (latitude 6.9980° N, longitude 3.4737° E), covers about 16,762 km² and had a projected population of 5.2 million in 2020 (NPC, 2006). Agriculture dominates the state's economy, with crops like cocoa, cassava and maize, alongside a significant poultry sector providing livelihoods for rural households (Osinowo and Tolorunju, 2019).

A multistage sampling technique was used. First, 20% of LGAs (six LGAs) were randomly selected. One community per LGA was chosen, yielding six communities. From each community, 20 poultry farmers were randomly selected, giving a total of 160 respondents. Data were collected via structured questionnaires covering socioeconomic characteristics, perception and extent of DCT use, and constraints. Data were analysed using percentages, means, standard deviation, chi-square, and Pearson correlation.

Perception of DCT use was measured with 13 statements on a four-point Likert scale from strongly agree (4) to strongly disagree (1), with reverse scoring for negative statements. Responses were summed to create a perception index, classifying respondents as having favourable or unfavourable perceptions based on the mean (56.31±5.22).

Fourteen DCTs were evaluated for usage extent on a scale from "to a large extent" (3) to "not at all" (0). An index of extent was calculated to classify respondents as low or high users (mean = 14.16±5.42). Ten potential constraints were rated as severe (2), mild (1), or not a constraint (0), with mean scores used to prioritise challenges and classify respondents into low or high constraint groups (7.94±3.31). Socioeconomic factors including age, education, and marital status were

also assessed, and hypotheses were tested using chi-square and Pearson correlation at $\alpha = 0.05$.

RESULTS AND DISCUSSION

Farmers' Perception of Digital Communication Tools (DCTs) for poultry production

Table 1 summarises poultry farmers' perceptions of DCT use in poultry production. Overall, farmers viewed DCTs as beneficial for improving agricultural innovation and business operations.

Farmers rated Facebook highly for cost-effective advertising ($\bar{x}$= 4.91), reflecting its utility for market insights and business intelligence. WhatsApp was also rated favourably ($\bar{x}$= 4.70) for facilitating customer feedback and communication, supporting stronger customer relationships, consistent with Hafiar and Lukman (2018), who highlighted WhatsApp groups as effective, interactive, and low-cost promotional tools. YouTube ($\bar{x}$= 4.69) was valued for disseminating agricultural information, while Instagram ($\bar{x}$= 4.68) was seen as useful for sharing information with customers and suppliers. Facebook ($\bar{x}$= 4.68) was also recognised for its convenience in reaching both stakeholders and coordinating activities.

The data show that 60.7% of respondents had a favourable perception of DCTs, indicating general optimism about their role in poultry production, while 39.3% expressed scepticism or challenges in usage.

Table 1. Poultry farmers' perception of DCTs use

Perception statements	**Mean Score/ SD**
Advertisement cost is cheap with Facebook usage	4.91 ± 0.2
It is easy to receive feedback from customers through WhatsApp	4.70 ± 1.4
Communicating agriculture and extension information spreads faster using YouTube	4.69 ± 1.4
Instagram use makes it easy to share information with customers/ suppliers/similar businesses	4.68 ± 1.4
Facebook use makes it easy to reach customers and suppliers	4.68 ± 0.5
WhatsApp usage enhances increased poultry product sales	4.55 ± 1.2
The cost of maintaining Data Analytical Platforms is cheap	4.67 ± 0.8
Skype can be a useful source of agricultural information	4.56 ± 0.6
Perception category	**Percentage**
Favourable	60.3
Unfavourable	39.7
Perception index	**Mean**
	56.32±5.22

Source: Field survey, 2023.

Extent of DCTs Use for poultry production

Table 2 summarises poultry farmers' use of DCTs. Facebook ($\bar{x}$= 2.76) was the most used platform, followed closely by WhatsApp ($\bar{x}$= 2.73), reflecting their popularity for communication and information exchange. Zoom ($\bar{x}$= 1.19) and YouTube (Mean = 1.14) were used less, while Instagram ($\bar{x}$= 0.88), websites and blogs ($\bar{x}$= 0.85) and Skype ($\bar{x}$=0.79) had minimal adoption. This indicates a preference for interactive, user-friendly platforms that support real-time communication and marketing.

Table 2. Distribution of respondents by the use of DCTs for poultry production

Type of DCTs	**Mean Score/ SD**
Facebook	2.76 ± 0.7
WhatsApp	2.73 ± 0.7
Zoom	1.19 ± 2.0
YouTube	1.14 ± 1.5
Instagram	0.88 ± 1.2
Websites and blogs	0.85 ± 1.2
Skype	0.79 ± 1.2
Weather App & alert	0.68 ± 1.0
Poultry management software	0.53 ± 1.4
Data Analytic Platforms	0.08 ± 0.5
Level of DCTs usage	**Percentage**
Low	59.1
High	40.9
Level of use index	**Mean/SD** = 14.16±5.42

Source: Field survey, 2023.

The high usage of Facebook and WhatsApp also suggests their cost-effectiveness and accessibility, enabling even small-scale farmers to engage effectively, consistent with Mhina *et al.,* (2023), who reported these platforms as key tools for accessing information on poultry management, diseases, and housing. The data further show that 70.2% of respondents were low DCT users, indicating limited engagement with digital tools for agricultural innovation, while 29.8% were classified as high users. This highlights a need to improve access, training, and awareness to increase DCT adoption among poultry farmers.

Constraints faced by poultry farmers in the use of DCTs

Table 3 presents the main constraints poultry farmers face in using DCTs. The highest-ranked challenge was high cost of services ($\bar{x}$= 1.62), indicating that financial barriers limit access and use of digital tools. Erratic power supply ($\bar{x}$= 1.54) was the second major constraint, showing that unreliable electricity hampers effective DCT utilisation. High cost of DCT devices ($\bar{x}$= 1.36) and poor internet reception ($\bar{x}$= 1.16) were also significant, reflecting the importance of affordable devices and reliable connectivity for adoption. Lack of awareness of DCT roles ($\bar{x}$= 0.82) further limits utilisation. These findings align with Ayandiji *et al.,* (2021), who reported poor connectivity and high data costs as major obstacles.

Table 3. Constraints faced by poultry farmers in the use of DCTs

Constraints	**Mean Score/SD**
High cost of services	1.62 ± 0.6
Erratic power supply	1.54 ± 0.8
High cost of DCTs device	1.36 ± 0.8
Poor internet reception	1.16 ± 0.7
lack of awareness of DCT roles	0.82 ± 0.5
Level of Constraint to DCT use	**Percentage**
Low	40.3
High	59.7
Index of constraints	7.94±3.31

Source: Field survey, 2023.

Relationship between socioeconomic characteristics and DCTs use for poultry production

Table 4 shows the associations between selected socioeconomic factors and the level of DCTs use. Age had a significant negative correlation (r = -0.284), indicating older farmers are less likely to adopt DCTs, while stock size showed a positive correlation (r = 0.171), suggesting farmers with larger flocks use DCTs more. Household size (r = 0.011) and years of education (r = 0.052) also positively influence DCTs adoption. These findings align with Ifeanyi-obi *et al.,* (2023), who reported age, education, and farm size as significant determinants of digital tool use in poultry management. Variables such as sex, marital status, income and years of experience were not significantly associated with DCTs use.

Table 15. Relationship between some selected socioeconomic characteristics and level of DCTs use for Poultry Production

Variable	**χ^{2-} value**	**df**	**r- value**
Sex	0.612[a]	1	
Marital status	24.558[a]	3	
Age			-0.284**
Years of formal education			0.052**
Household size			0.011**
Income			-0.65
Years of experience			-0.067
Stock size			0.171**

**p≤ 0.05 = significant. Source: Field survey, 2023

CONCLUSION AND RECOMMENDATIONS

The findings indicate that while a majority of respondents have a favourable perception of DCTs, they encounter significant constraints that impede their effective utilisation. The most prevalent challenges include erratic power supply, limited internet access, high initial costs associated with digital tools and the high cost of services. The analysis reveals significant associations between marital status, age and household size with DCTs use for agricultural innovation.

Efforts should be made to improve access to reliable electricity and internet connectivity in areas where poultry farming is prevalent. Training programs and workshops should be organised to enhance the digital literacy skills of poultry farmers. Strategies should be implemented to reduce the initial costs associated with acquiring digital tools and services. This could include subsidies, grants or incentives for poultry farmers to invest in DCTs. Awareness campaigns should be conducted to educate poultry farmers about the potential benefits of DCTs and how they can overcome existing constraints.

REFERENCES

Adamaagashi, I. P., Obinna, N., Obiorah, J., Ogar E. E. and Abdulhameed, A. I. (2023). Analysing the critical impact of climate change on agriculture and food security in Nigeria. *International Journal of Agriculture and Earth Science (IJAES)*, 9(4),1-28

Ayandiji, A., Afolabi, C. O. and Olaojo G. O. (2021). Use of Social Media in sourcing Agricultural information among farmers in Oyo Central Senatorial District, Oyo State, Nigeria. *Nigerian Journal of Rural Sociology, 21(1),*1-4.

Birhanu, M. Y., Bruno, J. E., Alemayehu, T., Esatu, W., Geremew, K.,Yemane, T., Kebede, F. G. and Dessie, T. (2022). Beyond diffusion to sustained adoption of innovation: A case of smallholder poultry development in sub-Saharan Africa. *International Journal of Agricultural Sustainability, 20(4)*. doi:10.1080/14735903.2022.2041235.

Hafiar H. and Lukman S., (2018). Optimizing promotional activities through WhatsApp group (WAG) in capturing candidates for boarding school. *PROMEDIA 4(1)*:56-75.

Ifeanyi-obi, C. C. and Corbon, B. L. (2023). Utilisation of digital tools in extension service delivery amongst extension agents in Akwa Ibom State, Nigeria. *Journal of Agricultural Extension, 27 (4),* 67-76. https://dx.doi.org/10.4314/jae.v27i4.7.

Mhina, J., Mwaseba, D., Ahmad, A. and Shausi, G. (2023). Small-Scale Chicken Farmers' Use of Social Media to Access Market Information in Arusha City, Tanzania. *Asian Journal of Agricultural Extension, Economics & Sociology, 41(10),* 1014-1027. 10.9734/ajaees/2023/v41i102255.

Olanrewaju, K. O., Akintunde, O. K., Moshood, A., Popoola, M. O., Busari, A. O. and Omotosho. M. O. (2021). Towards the digitalization of poultry industry in Nigeria: An investigation of farmers' knowledge and practices. *African Journal of Science, Technology, Innovation and Development.* 1(5), 1-8.

Osinowo, H. and Tolorunju, E. (2019). Technical efficiency of poultry egg production in Ogun State, Nigeria. *Journal of Agribusiness and Rural Development. 51(1),* 51-58. doi.org/10.17306/J.JARD.2019.01137.

Otunaruke, P., Enwa, S., Sorhue, U. and Efe, O. (2023). Profitability And Constraints Of Poultry Production Among Households In South - South, Nigeria. Implications For Protein Intake Sustainability. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 23(4),*1-9.

ASSESSMENT OF SMALLHOLDER FARMERS' USE OF AGRICULTURAL INSURANCE SCHEMES IN IFO LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

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ABSTRACT
Agrarian communities largely depend on rain-fed farming, thus predisposed to risk and uncertainties associated with weather vagaries. Insurance packages can help farmers mitigate these risks. This study assessed the use of agricultural insurance packages (AIP) among smallholder farmers in Ifo Local Government Area of Ogun state, Nigeria. A multistage sampling technique was employed to elicit information from 100 respondents and primary data were obtained with structured questionnaires. Descriptive statistics was used to summarize data collected while Chi-square and Pearson product moment correlation (PPMC) were used to test for hypotheses testing. Findings reveal a predominant male (60%) and an economically active (mean age of 41years) respondents. About 45% were married, and 59% had tertiary education with >20 years farming experience. Results further show that crop insurance package (mean = 1.30) ranked 1st. Majority (90%) of respondents obtain firsthand information on agricultural insurance packages on radio programs. Most severe constraints to the usage of AIP were limited financial resources (mean = 1.33). Chi-square and correlation analysis indicates a significant relationship exist between educational status (x^2=10.395, p=0.011), access to extension services (x^2=10.281, p=0.016), farm size (r=-0.236, p=0.035), farming experience (r=-0.288, p=0.009) and usage of agricultural insurance packages in the study area. The study concluded that educational status, farming experience, farm size and access to extension services strongly influenced the usage of agricultural insurance packages in the study area. There is a significant relationship between farmers' level of awareness and their usage of agricultural insurance packages in the study area. This implies that as awareness levels increase, farmers are more likely to use agricultural insurance. Strengthening awareness campaigns through extension services, cooperatives, and media channels will therefore likely improve adoption and usage levels.
Keywords: Smallholder farmers, agricultural insurance, risk management, subsidy.

INTRODUCTION

Agriculture in Nigeria remains highly susceptible to risks stemming from weather variability, pests, diseases, and fluctuating market prices. Despite the nation's vast arable land, smallholder farmers, who form the majority of producers, face chronic productivity losses due to climate shocks and limited access to formal risk-management tools (Hardaker et al., 1991; Amaza, 2000). Agricultural insurance serves as a risk-transfer mechanism that cushions farmers against losses while stabilizing income and enabling credit access (Epetimehin, 2012; Owoeye *et al.*, 2020). The Nigerian Agricultural Insurance Scheme (NAIS), implemented through the Nigerian Agricultural Insurance Corporation (NAIC), provides a 50% premium subsidy jointly shared by federal and state governments (NAIC Act, CAP N89, 1993). However, adoption remains low (Akinola, 2014), partly due to poor awareness, complexity of policy terms, and inadequate extension support (Birner *et al.*, 2006; Ijeoma & Adesope, 2015). This study assessed smallholder farmers use, awareness, and constraints to agricultural insurance in Ifo LGA.

METHODOLOGY

The study area, Ifo Local Government Area of Ogun State, is a semi-urban farming community where crop livestock systems dominate. Using a descriptive survey design, 100 smallholder farmers were randomly selected through multistage sampling. Sample size was derived using Taro Yamane's (1967) formula from registered farmers under the Ogun State Agricultural

Development Programme (ADP). Primary data were obtained via structured interview guide capturing socio-economic attributes, awareness levels, sources of information, and constraints to usage. Descriptive statistics (frequency, percentage, mean) summarized responses, while Chi-square and Pearson correlation tested hypotheses relating to socio-economic characteristics, constraints, and insurance utilisation.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The result in table 1 shows that respondents were mostly male (60%), with an average age of 41years. Most (59%) had tertiary education, average farm size of 5 hectares, and income between ₦50,000–₦100,000 monthly. Farming experience averaged nine years, and 59% belonged to cooperatives—facilitating information access and group insurance participation. These characteristics suggest a literate and economically active farming population suited for agricultural insurance engagement.

Table 1: Socio-economic characteristics of the respondents

Variable	Category	Frequency	Percentage	Mean	SD
Sex	Male	60	60.0		
	Female	40	40.0		
Age	20 35	45	45.0.	40.78	14.18
	36 50	30	30.0		
	51 65	15	15.0		
	66 70	10	10.0		
Education	Primary	10	10.0		
	Secondary	32	32.0		
	Tertiary	58	58.0		
Farm Size (Ha)	1 2	9	9.0	5.13	1.55
	3 4	12	12.0		
	5 6	70	70.0		
	7 8	6	6.0		
	Above 8	3	3.0		
Farming Exp. (Years)	1 5	40	40.0	7.50	5.27
	6–10	35	35.0		
	11–15	15	15.0		
	16–20	7	7.0		
	Above 20	3	3.0		
Coop. Membership	Yes	59	59.0		
	No	41	41.0		
Monthly Income (₦)	<50,000	20	20.0	1.2,500	62,513
	50,000–100,000	40	40.0		
	101,000–150,000	15	15.0		
	151,000–200,000	15	15.0		
	>200,000	10	10.0		

Source: Field Survey, 2025

Sources of information

Radio (90%) was the dominant source of information, followed by farmers associations (70%) and internet/social media (68%). Agricultural Development Programmes (63%) and extension workers (55%) also played important roles. However, television (36%) and newspapers (35%) were less utilised. This pattern highlights the enduring role of mass media and peer networks in rural communication and underscores the need for ICT integration in insurance sensitization (Olawale & Bello, 2021).

Table 2: Sources of information on agricultural insurance scheme

Source	Yes (%)	No (%)
Radio	90 (90.0)	10 (10.0)
Television	36 (36.0)	64 (64.0)
Internet (social media)	68 (68.0)	32(32.0)
Family & Friends	60 (60.0)	40 (40.0)
Newspaper	35 (35.0)	65 (65.0)
Farmers' group	70 (70.0)	30 (30.0)
Print media	28 (28.0)	72(72.0)
Agricultural Dev. Prog.	63 (63.0)	37 (37.0)
Extension Workers	55(55.0)	45(45.0)

Source: Field Survey, 2025.

Awareness and level of usage

As shown in Figure 1, awareness was highest for crop insurance (75%), followed by livestock (60%) and whole-farm insurance (56%). Micro (50%) and yield-based (42%) insurance packages had lower awareness levels. Overall, 65% of respondents demonstrated high awareness, while 67% showed high usage of at least one insurance type. Crop insurance ranked highest in usage (mean = 1.30), confirming its perceived relevance to farmers predominant risks. Revenue and yield-based insurance recorded minimal adoption, consistent with reports that product complexity and low promotion hinder uptake (Oladejo & Adedeji, 2020).

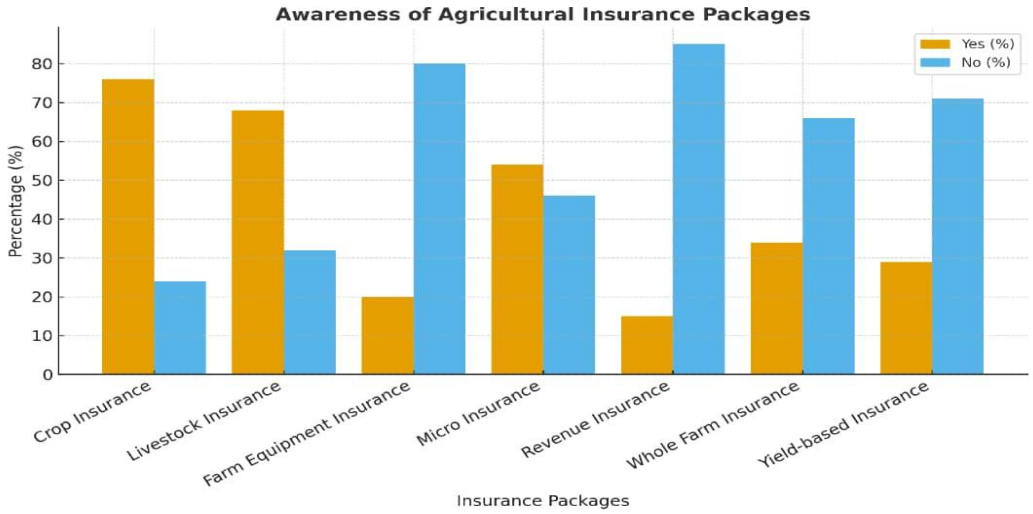

Figure 1: Farmers' awareness of Agricultural Insurance

Types and level of usage of agricultural insurance packages

The result in Figure 2 indicates that crop insurance recorded the highest level of usage among respondents, followed by whole farm and micro insurance. This suggests that farmers prioritize coverage directly linked to their major production risks. The relatively high usage of crop and livestock insurance agrees with Adekunle et al. (2021) and Owoeye et al. (2020), who reported that these packages are the most accessible and promoted among smallholder farmers. Conversely, the low patronage of revenue and yield-based insurance corroborates Oladejo and Adedeji (2020), attributing it to limited awareness and product complexity. The pattern reflects the diffusion of innovation model (Rogers, 2003), where awareness strongly influences adoption. Thus, improved extension services and product simplification could enhance uptake across all insurance types.

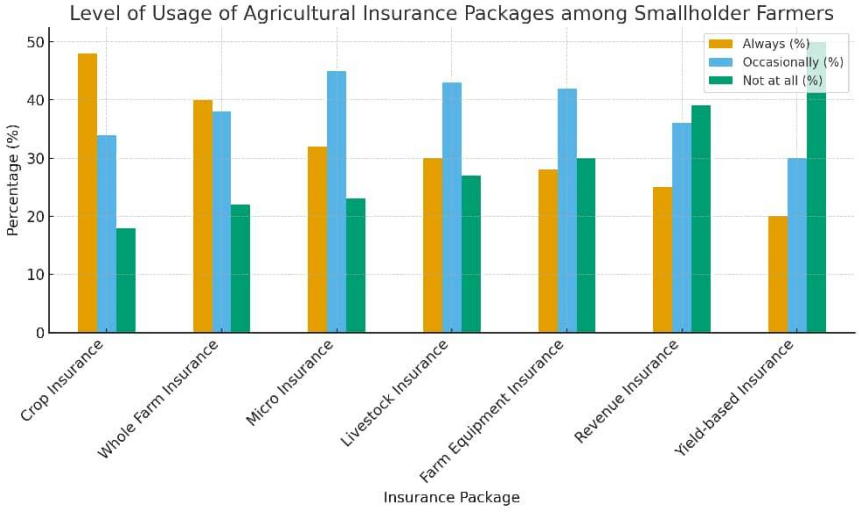

Figure2: Level of Usage of Agricultural Insurance Packages among Smallholder farmers

Hypotheses testing

Statistical analysis revealed that educational status (χ^2=10.395; p=0.011), access to extension services (χ^2=10.281; p=0.016), farm size (r=–0.236; p=0.035), and farming experience (r=–0.288; p=0.009) significantly influenced insurance usage. Conversely, age, sex, marital status, occupation, and income were not significant.

Table 3: Result of chi-square analysis between the socio-economic characteristics of the respondents and level of usage of agricultural insurance packages

Variables	χ^2	df	p-value	Decision
Sex	0.608	1	0.436	NS
Religion	4.448	2	0.108	NS
Marital status	2.938	4	0.568	NS
Secondary occupation	5.486	4	0.241	NS
Educational status	10.396	2	0.011	S
Member of cooperative society	0.700	1	0.403	NS
Access to extension services	10.281	3	0.016	S

Source: Field survey, 2025

Table 4: Pearson correlation result between socio-economic characteristics of the respondents and level of usage of agricultural insurance packages

Variables	r value	p value	Decision
Age	0.009	0.936	NS
Farm size	-0.236	0.035	S
Farming experience	-0.288	0.009	S
Monthly income	-0.203	0.070	NS

Source: Field survey, 2025

Table 4: Relationship between Awareness and Usage Level of Agricultural Insurance Packages

Variable Pair Tested	χ^2 (Chi-square)	df	p-value	Decision
Awareness	9.63	1	0.002	Significant (S)

Source: Field survey 2025.At 5% level of significance, $p \leq 0.05$.

CONCLUSION AND RECOMMENDATIONS

The study concludes that while most farmers are aware of agricultural insurance schemes, actual utilisation is constrained by financial limitations, policy complexity, and institutional inefficiencies. Educational attainment, farm size, and extension contact emerged as major determinants of usage. The existing subsidy, though beneficial, is insufficient to drive participation without enhanced awareness, transparent claim processes and timely disbursement.

1. Strengthen Awareness of the 25% Government Subsidy: Government agencies and the Nigerian Agricultural Insurance Corporation (NAIC) should intensify sensitization campaigns to ensure farmers fully understand and access the 25% premium subsidy. Publicizing the process through radio, farmer groups, and community extension platforms will improve participation.
2. Simplify Access to Subsidized Insurance Packages.
   The procedures for enrolling in subsidized agricultural insurance schemes should be made farmer-friendly by reducing paperwork and technical terms. This will encourage low-literacy farmers to participate confidently.

REFERENCES

Akinola, A. A. (2014). Agricultural insurance and risk management in Nigeria: Issues and prospects. *Journal of Economics and Sustainable Development*, 5(10), 111 120.

Amaza, P. S. (2000). *Resource-use efficiency in food crop production in Gombe State, Nigeria*. Ph.D. Thesis, Department of Agricultural Economics, University of Ibadan, Nigeria.

Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., & Cohen, M. (2006). *From best practice to best fit: A framework for analysing pluralistic agricultural advisory services worldwide*. International Food Policy Research Institute (IFPRI) Discussion Paper No. 37.

Epetimehin, F. M. (2012). Agricultural insurance in Nigeria and the economic impact. *International Journal of Academic Research in Economics and Management Sciences*, 1(6), 1 8.

Hardaker, J. B., Huirne, R. B. M., & Anderson, J. R. (1991). *Coping with risk in agriculture*. CABI Publishing.

Ijeoma, E. M., & Adesope, O. M. (2015). Farmers perception of agricultural insurance in Imo State, Nigeria. *Journal of Agricultural Extension*, 19(2), 73 83. https://doi.org/10.4314/jae.v19i2.8

NAIC Act, CAP N89. (1993). *Nigerian Agricultural Insurance Corporation Act*. Laws of the

Federation of Nigeria. Federal Government of Nigeria.

Olawale, O. A., & Bello, A. F. (2021). Information and communication technology (ICT) and agricultural risk management among farmers in Southwest Nigeria. *African Journal of Agricultural and Resource Economics*, 16(2), 132 143.

Oladejo, J. A., & Adedeji, I. A. (2020). Adoption of agricultural insurance schemes among farmers in Osun State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 12(3), 45 53. https://doi.org/10.5897/JAERD2020.1182

Owoeye, R. S., Adebayo, K., & Ogunjimi, S. I. (2020). The role of agricultural insurance in enhancing agricultural productivity in Nigeria. *Nigerian Journal of Agricultural Economics*, 10(1), 45 55.

Taro Yamane. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.

DETERMINANTS OF FOOD CONSUMPTION PATTERN AMONG RURAL AND URBAN HOUSEHOLDS IN EKITI STATE, NIGERIA

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ABSTRACT
The study assessed the determinants of food consumption patterns among rural and urban households in Ekiti State. Data were collected through a well-structured questionnaire administered to 180 respondents selected using a three-stage sampling procedure. The findings revealed that most respondents were female (77.1%), married (79%), with a mean age of 44 years. Civil servants (51%) and traders (33%) were the dominant occupations, while more than half (53.5%) had tertiary education. Low income ($\bar{x}$ = 2.74), unfavourable policies ($\bar{x}$ = 2.69), and seasonal food availability ($\bar{x}$ = 2.30) were the major constraints to consumption patterns. Also, it revealed that cereals ($\bar{x}$ = 1.58) and roots/tubers ($\bar{x}$ = 1.58) were the most frequently consumed food groups, with over 90% of respondents consuming them regularly. Vegetables ($\bar{x}$ = 2.09) and fruits ($\bar{x}$ = 2.11) were also commonly consumed but less consistently, reflecting seasonal influences. Animal protein intake was moderate, with fish ($\bar{x}$ = 2.25) consumed more frequently, indicating affordability as an important factor. Significant differences existed between rural and urban households (t = -4.102, p = 0.000), with urban households showing greater dietary diversity. The results revealed that location (β = 0.321) and age (β = -0.203) influenced consumption patterns. The study concludes that household diets are largely dominated by staple foods, with location and age as key determinants of consumption patterns. It recommends strategic food and nutrition awareness programs targeted at rural households and the elderly, as well as strategic interventions to enhance food availability and affordability.
Keywords: Food consumption pattern, location, dietary diversity, food and nutrition awareness.

INTRODUCTION

Food is one of the most essential human needs for survival as it strongly connects to human's physical, mental and social well-being. An adequate and healthy diet is required to define an active and healthy life which provides all essential nutrients required to identify and express the relationship between diet and health (Herforth, et al. 2020). However, adequate access to this diet by individuals has not been achieved as a result of constraint to affordability (FAO et al. 2020; Bai et al. 2021). Study reveals that household with low income would have to increase spending on food expenditures by 13% to meet the least cost diet requirement, and 43% to adapt to current required healthy foods (Mekonnen et al. 2021a). The unaffordability of a healthy diet is higher in rural than urban areas. Although there are several determinants and factors influencing the food consumption pattern of individuals, which may include the socio economic and demographic characteristics of individuals where individuals in the urban are regarded to have higher income and awareness thereby allowing them to afford more diets. The differences in the nutritional variation across federal states may be related to obvious food systems and policies which determine the availability, affordability, and accessibility of various food to meet dietary needs such as production, processing, market, environments, and individual behaviour or satisfaction (HLPE, 2017). Moreover, according to (de Brauw, Herskowitz, 2018) urbanization and rapid population growth, food systems in urban and rural areas may grow more distinct where urban areas will depend solely on food purchase which may entail access to quality and diverse diets compared to the rural populace as well as purchasing power.

In Nigeria the importance of food choices is not conspicuously proven among various individuals in the rural and urban areas. For instance, the consumption of fruits in many areas are at leisure, by the rich or the sick with less regard to its health benefits but rather take diets with less nutritional benefit to the body but create problems for some organs. This food consumption pattern prevents people from making proper dietary choices which may be as a result of attitudes, knowledge of balanced and healthy diet, purchasing power, culture and environment which influences consumer's demand and intake. Some cultural beliefs prohibit certain foods and also accept certain foods that are of nutritional benefit to the body which influences the food consumption pattern of people who are identified to it. The cultural background influences the intake by individuals where individuals in the rural area maintain a steady pattern as a result of the culture. This is otherwise in the urban area where individual dietary pattern is influenced by emigration of diverse cultural groups and processes. (Adegboye et al. 2016). However, the recent hike in the prices of food as a result of the economy in every part of the country has left many households insecure and malnourished (Sahel and West Africa Club Secretariat, 2020).

Meanwhile despite various approaches to addressing food availability and affordability, study revealed a large proportion of individuals living below the daily dietary requirement but has not clearly defined the varying determinants to household food consumption patterns among the rural and urban which describes the quantity and quality of varieties of food consumed at individual

and household level. It is therefore imperative to assess the determinants of food consumption pattern among rural and urban households in Ekiti state also to improve access to healthy diets. Specifically, it:

1. identified the socio-economic characteristics of the respondents in the area.
2. determined the level of knowledge of food consumption among rural and urban household in Ekiti state.
3. examined the attitude of respondents to food consumption in the area.
4. determined the extent to which social and cultural factors influence food consumption pattern in rural and urban area.
5. identified the determinants of food consumption pattern among the respondents in the study area.
6. identified the constraints to food consumption pattern in the study area.

The hypotheses of the study were stated as follows:

Ho1: There is no significant relationship in the selected socio-economic characteristics of respondent and food consumption pattern in the study area.

Ho2: There is no significant relationship in the knowledge of respondents and food consumption pattern in the study area.

Ho3: There is no significant relationship in the attitude of respondents and their food consumption pattern in the study area.

Ho4: There is no significant relationship in the challenges faced by respondents and their food consumption pattern in the study area.

Ho5: There is no significant difference in the food consumption pattern of rural and urban households in the study area.

METHODOLOGY

The study was conducted in Ekiti State, Nigeria, which was established on October 1, 1996. Situated entirely within the tropics, the state lies between longitudes 4° 45′ and 5° 45′ East of the Greenwich Meridian and latitudes 7° 15′ and 8° 51′ North of the Equator. Ekiti State experiences a tropical climate with two distinct seasons: the rainy season (April–October) and the dry season (November–March). It is bordered by Kwara and Kogi States to the north, Osun State to the west, and Ondo State to the east and south. Covering a total land area of 5,887.890 square kilometres, the state comprises 16 local government areas. The primary occupations in Ekiti State include farming, civil service, and petty trading. Agriculture plays a vital role in the state's economy, providing income and employment for over 75% of the population. Major food crops cultivated include yam, cocoyam, cassava, maize, plantain, banana, rice, pepper, tomatoes, and various vegetables. Dietary habits in Ekiti are influenced by the dominant ethnic group, with staple foods such as rice, yam, maize, and cassava widely consumed. These staples are processed into various forms to suit household preferences, such as maize into pap, cassava into garri or flour, and yam into yam flour or pounded yam. Food consumption patterns among rural and urban households are shaped by cultural influences, household size, and purchasing power.

The study population comprised of rural and urban households in Ekiti state. Multistage sampling procedure was used to select respondents for the study. The first stage involved purposive selection of two local government areas out of the sixteen local government areas: one urban and one rural reflecting on data from the National Longitudinal Phone Survey (NLPS2020-2023) Afe Babalola University & Ekiti State Government, (2022) on level of food insecurity and hunger in the state. The study was conducted using Ado local government as urban community which is as a result of low hunger and food insecurity, high population and infrastructural development also Ido-Osi Local Government as rural community which is as a result of high level of hunger and food insecurity, low population and less infrastructural development. The second stage, six communities was randomly selected from each local government which are Ajilosun, Oke-Bola, Bashiri, Irona, Odo-Ado, Okeyinmi in Ado local government and Ido, Usi, Ayetoro, Osi, Ifaki, Ilogbo, in Ido-Osi local government. The last stage involved the random selection of 15 households in each of the communities which involved the family head whose decision influences dietary pattern. This resulted in an aggregate of 180 households. Questionnaires was issued to both rural and urban households in the area.

Respondents were asked to state their age in years as well as household size and was measured at interval level. Also, sex of respondents was indicated with scores of 1 “male” and 2 “female” assigned. Marital status was obtained as single, married, divorced and widowed. Respondents’ highest level of education was indicated as no formal education, primary, secondary and tertiary with respective scores of 0, 1, 2, and 3 assigned.

Level of knowledge of food consumption was ascertained by providing a list of 8 questions cutting across food security, availability and access to market. Respondents were asked to indicate from the options the correct and not correct responses and were awarded score of 1 and 0 respectively. The computed frequency and percentage were used as benchmark to categorize them into high and low.

Respondents’ attitude to food consumption pattern was measured by asking them to indicate from the stated options on a scale of Strongly Agree (SA) 5, Agree (A) 4, Undecided (U) 3, Disagree (D) 2 and Strongly Disagree (SD) 1. The responses were summed and mean score was generated as a

benchmark to categorise them into most relevant and less relevant.

Respondents were asked to indicate from a provided list the social and cultural factor influence towards food consumption. This was indicated on a binary scale of Yes 1, No 0. The computed percentage was used to categorise them into most significant to less significant.

Respondents were presented with a list of possible challenges faced by food consumers in rural and urban areas of Ekiti State. This was indicated on a scale of Severe Challenge 2, mild challenge 1 and Not a challenge 0. The responses were summed and mean score was used as benchmark to categorise them into most significant and less significant.

Conclusively**,** respondents food consumption pattern was assessed using the Household Dietary Diversity Score (HDDS) which was calculated based on whether anyone in the household consumed any food from the 12 food groups with a recall period of 24 hours with a score 1 Yes, 0 No and how frequent in the last 7days with assigned scores of Daily 3, Biweekly 2, Weekly 1. The food groups (FG) include the following: cereals, roots and tuber, vegetables, fruits, meat, poultry(egg), fish and other sea food, Legumes, nuts, seeds, diary (milk), oils and fats and sugars.

RESULTS AND DISCUSSION

Level of knowledge

Data in Table 1 reveal that majority (95%) defined food security as having access to sufficient nutritious food indicating that respondents have a strong grasp of core food concepts. However, notable knowledge gaps exist regarding socioeconomic factors where they are unaware of how external factors like market conditions and climate change impact food choices.

Table 1: Level of knowledge of food consumption

S/N	Items	Correct f (%)	Not correct f (%)
1.	Food security means having access to enough safe and nutritious food to live a healthy and active life at all time.	162 95	8 5
2.	Climate change could influence consumption pattern.	122 72	48 28
3	Lack of access to market has nothing to do with consumption pattern.	71 42	99 58
4	Healthy food must contain adequate nutrient required for growth and development.	149 88	21 12
5	I am aware that poverty, climate change, and lack of access to markets have nothing to do with consumption pattern.	82 48	88 52
6	Availability of food is not the only factor that influences my food choices and consumption pattern.	34 20	136 80
7	Households with limited income could as well attain adequate nutrients in their meals.	134 79	36 21
8.	Inadequate nutrients in meals could make children vulnerable to diseases and infection.	143 84	27 16

Source: Field survey, 2024

Respondents' attitude to food consumption patterns in the area

Data in Table 2 reveals that nine variables were more relevant while one of the remaining two were slightly relevant; the remaining one was less relevant. The respondents identified that a food secure household is likely to have better consumption pattern ($\bar{x}$ =4.59). They also expressed less attitude to fruits and vegetables being consumed only when one is sick. ($\bar{x}$ =1.88). This implies how attitude of respondents has influenced the food consumption of respondents in the study area.

Extent to which social and cultural factors influence food consumption pattern

Data in Table 3 reveal that the most significant was the influence of the state of the economy on consumption patterns, with 92% of respondents affirming its impact. This indicates that economic conditions play a crucial role in determining food choices. It highlights that economic conditions and social interactions have the most significant influence on food consumption patterns in the study area.

Table 2: Attitude towards food consumption pattern in the area.

S/N	Items	SA f %	A f %	U f %	D f %	SD f %	Mean
1.	A food secure household is likely to have better consumption pattern.	590 76	156 20	27 3	8 1	0 0	4.59
2.	Food security could play out has a factor of consumption pattern among household.	470 62	256 34	18 2	12 2	0 0	4.45
3.	Reducing food wastage could improve food security and consumption pattern.	395 56	232 33	36 5	34 5	4 1	4.12
4.	I am willing to pay more for nutritious foods.	330 49	264 39	39 6	40 6	5 1	3.99
5.	My continuous food consumption pattern does not guarantee food security.	255 40	280 44	54 8	44 7	9 1	3.78
6.	Food choices in my locality do not necessarily meet my dietary needs.	155 26	328 54	57 9	48 8	14 2	3.54
7.	Sustainable food practices like processing and storage will not possibly influence consumption pattern.	265 45	164 28	39 7	118 20	4 1	3.47
8.	Social pressure has a way of influencing my food consumption pattern.	155 27	292 51	36 6	82 14	13 2	3.40
9.	I feel that fast food and locally sourced food are affordable and accessible and influence consumption pattern.	180 33	184 34	45 8	128 23	9 2	3.21
10	Consumption of dairy products is only meant for babies and visitors.	85 21	52 13	66 16	176 43	30 7	2.41
11	I think fruits and vegetables should be consumed only when one is sick.	75 23	120 38	42 13	32 10	51 16	1.88

Source: Field survey, 2024.

Table 3: Extent to which social and cultural factors influence food consumption patterns

S/N	Items	Yes f (%)	No f (%)
1.	My consumption pattern is greatly influenced by the state of the economy.	157 92	13 8
2.	Hospitality and friendship influences food consumption pattern in my area.	115 68	55 32
3.	Food consumption is influenced due to its significance in ceremonies.	79 46	91 54
4.	I eat starchy food because it provides the energy required for work.	132 78	38 22
5.	Cultural activities such as inter-ethnic or intra-ethnic marriage influence my food consumption pattern.	86 51	84 49
6.	I consume fruits and dairy products because of its significance while sick.	71 42	99 58
7.	Cultural belief and pattern influence my food choices.	77 45	93 55
8	Special ceremonies and feasts do not influence my food consumption pattern.	137 81	33 19
9	The use of diet to maintain health conditions influences my consumption pattern.	129 76	41 24
10	I consume vegetables because of its medicinal properties.	127 75	43 25

Source: Field survey, 2024

Challenges to food consumption pattern

The result in Table 4 indicate that low income and social status ($\bar{x}$= 1.7) and unfavourable government policies and interventions ($\bar{x}$=1.7) were the most significant challenges, suggesting that financial constraints and policy related factors play a significant role in shaping food choices Meanwhile, limited access to cooking classes or education ($\bar{x}$= 0.7) were considered the least relevant challenges.

Table 4: The challenges faced by food consumers in rural and urban areas of Ekiti state

S/N	Items	Severe challenge f (%)	Mild Challenge f (%)	Not a challenge f (%)	Mean
1	Low income and social status.	133 78	29 17	8 5	1.7
2	Unfavourable government policies and interventions.	123 72	42 25	5 3	1.7
3	Limited access to diverse food options.	89 52	57 34	24 14	1.4
4	Seasonal availability of foods in the area.	87 51	47 28	36 21	1.3
5	Limited access to local and traditional foods.	50 29	81 48	39 23	1.1
6	Poor food packaging, marketing and advertising.	62 36	63 37	45 26	1.1
7	Large household size and living situation.	54 32	79 46	37 22	1.1
8	Increased emotional challenges like stress, anxiety and depression.	53 31	72 42	45 26	1.1
9	Declining social norms and cultural practices.	30 18	102 60	38 22	1.0
10	Limited access to market.	43 25	81 48	46 27	1.0
11	Intense work schedule.	44 26	76 45	50 29	1.0
12	Low level of education and awareness on healthy diet.	62 36	50 29	58 34	1.0
13	Busy schedules or limited time to prepare healthy meal.	47 28	59 35	64 38	0.9
14	Lack of cooking skills to prepare healthy food.	37 22	53 31	80 47	0.8
15	Inadequate healthcare professionals or registered dietitians for nutrition guidance.	46 27	49 29	75 44	0.8
16	Limited access to cooking classes or education.	36 21	41 24	93 55	0.7

Source: Field survey, 2024.

Food consumption pattern in Ekiti state

The result in Table 5 indicates that cereals ($\bar{x}$ = 1.58) as well as roots and tubers ($\bar{x}$ = 1.58) are the most commonly consumed food groups, with 97% and 91% of respondents respectively consuming them. A significant proportion (62%) consume this daily for cereals and 58% for roots and tubers, reflecting their role as staple foods in the diet. Overall, the findings suggest that the diet in the study area is heavily reliant on staple foods such as cereals relating to Uduma et al. (2016); Fawole and Aderinoye-Abdulwahab, (2021) who posits that cereals is one of the most consumed staples in Nigeria. Rice among other cereals is said to be the highest demanded household food in recent years (Ihedioha et al.,2021).

Table 5: Distribution of respondents according to the food consumption pattern.

S/N	Food groups	Yes f (%)	No f (%)	Daily f (%)	Biweekly f %)	Weekly f (%)	Mean
1.	Cereals	165 97	5 3	105 62	32 19	33 19	1.58
2.	Roots and tubers	155 91	15 9	99 58	44 26	27 16	1.58
3.	Vegetables	126 74	44 26	53 31	48 28	69 41	2.09
4.	Fruits	120 71	50 29	72 42	45 26	53 31	2.11
5.	Meat and Poultry	137 81	33 19	59 35	29 17	82 48	2.14
6.	Fish and seafood	120 71	50 29	53 31	22 13	95 56	2.25
7.	Eggs	92 54	78 46	31 18	37 22	102 60	2.42
8.	Legumes (pulses)	120 71	50 29	26 15	28 16	116 68	2.53
9.	Nuts and seeds	98 58	72 42	16 9	68 40	86 51	2.41
10.	Dairy (milk)	103 61	67 39	85 50	63 37	22 13	2.37
11.	Fats and oils	146 86	24 14	90 53	40 24	40 24	1.71
12.	Sugar/honey	108 64	62 36	105 62	32 19	33 19	2.23

Source: Field survey, 2024

Food consumption pattern among Rural and Urban Households in Ekiti state

The result in table 6 revealed differences in food consumption patterns between rural and urban households. Cereals such as maize, rice were consumed by nearly all respondents (97.1%), with urban households showing more frequent intake compared to rural respondents who largely consumed them weekly. Roots and tubers also recorded high consumption (91.2%), slightly higher among rural households (47.1%) than urban (44.1%), reflecting the prominence of locally cultivated staples in rural diets. Also, fruit consumption (70.6%) and animal source foods such as meat and poultry (80.6%), eggs (54.1%), and dairy products (60.6%) were generally higher among urban respondents, indicating greater dietary diversity and access to protein-rich foods. However, fish and seafood (70.6%) consumption was marginally higher among rural households, likely due to affordability, while consumption of vegetables (74.1%), legumes (70.6%), nuts and seeds (57.6%), and sugary products (63.5%) was general across both groups, the frequency and variety of intake were generally greater in urban areas. Fats and oils stood out as the only food group with higher weekly consumption in rural households (29.4%) compared to urban (21.8%), reflecting traditional cooking patterns reliant on palm oil.

The study posits rural households predominantly consumed traditional staples such as roots, tubers, and oils, whereas urban households exhibited greater food diversity with more frequent consumption of fruits, animal products, legumes, and dairy. These patterns highlight the influence of urbanization, income, and food accessibility on household consumption patter.

Table 6.: Distribution according to the food consumption pattern among rural and urban households

Food group	Total (%)	Rural (%)	Urban (%)	None (%)	Weekly (%)	Biweekly (%)	Daily (%)
Cereals (maize rice, wheat, etc.)	97.1	47.6	49.4	2.9	61.2	18.8	17.1
Roots & Tubers (yam, cassava, etc.)	91.2	47.1	44.1	8.8	57.1	22.4	11.8
Vegetables	74.1	35.9	38.2	26.5	30.0	15.3	28.2
Fruits	70.6	30.0	40.6	28.8	29.4	18.8	22.9
Meat & Poultry	80.6	37.6	42.9	20.0	30.6	16.5	32.9
Fish & Seafood	70.6	30.0	40.6	29.4	28.2	12.9	29.4
Eggs	54.1	22.4	31.8	45.3	16.5	13.5	24.7
Legumes	70.6	32.4	38.2	30.0	14.7	11.2	44.1
Nuts & Seeds (egusi, gbegiri)	57.6	20.0	37.6	41.2	8.2	20.0	30.6
Dairy Products (milk, cheese, yogurt)	60.6	25.3	35.3	39.4	11.2	22.4	27.1

Source: Field Survey 2024

Differences between food consumption patterns of rural and urban households in the study area.

Table 4.7.5 revealed the result of an Independent Samples t-test to compare the means of urban and rural households in the study areas. The results show a statistically significant difference in food consumption patterns between rural and urban populations (t= -4.102, p = 0.000). Along with earlier results, it further indicated the significant impact of location on consumption patterns reflecting that urban households tend to have a higher level of food consumption patterns compared to rural households in the study area as posited by de Brauw & Herskowitz, (2018). Moreover, the results highlight the complexity of food consumption patterns and suggest the need for further research into other potential influences.

Table 7: Differences in Food consumption pattern among rural and urban household

Test	t-value	df	p-value	Mean difference
Levene's test for equality of variances	F=2.431	-	0.121	-
T-test (equal variances not assumed)	-4.102	161.398	0.000	-3.717

Source: Field survey, 2024

Determinants of food consumption pattern among rural and urban households

The result in Table 7 shows significance of various socio-demographic and other predictors on the food consumption pattern among rural and urban households. Overall, some of the predictors were statistically significant at 5% ($p<0.05$). The Age of respondents showed a significant negative relationship ($\beta = -0.203$), indicating that an increase in age resulted in a decrease in consumption pattern, which supports the assertions by Mekonnen et al. (2021). Moreover, the location of respondents was another significant predictor ($\beta = 0.321$), implying that geographic differences play a key role in

shaping consumption patterns, which could be a result of variations in resources, socioeconomic conditions, and exposure, thereby supporting the assertions of deBrauw & Herskowitz (2018).

Additionally, socio-cultural influence was a significant predictor (β = 0.335), aligning with the assertions by Islam et al. (2019) suggesting that cultural norms, social expectations, and community influences significantly shape their food consumption pattern. Although other variables including sex, marital status, occupation, education, household size, knowledge, attitude, and challenges were assessed but not statistically significant as a result of the p value ($p > 0.05$), meaning they did not significantly influence the food consumption pattern among rural and urban households in the study area.

Table 7: Determinants of food consumption pattern among rural and urban households

Variables	R	p-value	Standardized Coefficients (β)	t-value	Standardized Error	Decision
Sex	0.113	0.344	-0.070	-0.949	5.577	N.S
Age	-0.058	0.026	-0.203	-2.253	-	S
Marital Status	-0.055	0.747	0.028	0.324	-	N.S
Primary Occupation	0.063	0.679	-0.040	-0.414	-	N.S
Educational Status	-0.230	0.965	-0.004	-0.044	-	N.S
Household Size	0.065	0.540	-0.044	-0.614	-	N.S
Location of Respondent	0.174	0.000	0.321	3.878	-	S
Knowledge	0.129	0.836	0.016	0.208	-	N.S
Attitude	-0.080	0.195	0.098	1.300	-	N.S
Socio Cultural Influence	-0.082	0.000	0.335	4.484	-	S
Challenges	-0.014	0.233	-0.097	-1.196	-	N.S

R^2=0.246, Adjusted R^2=0.193
Source: Field Survey 2024

CONCLUSION AND RECOMMENDATIONS

Food consumption patterns among rural and urban households are shaped by a complex interplay of socioeconomic and environmental factors. While rural households maintain traditional diets dominated by roots, tubers, and oils, urban households exhibit greater dietary diversity with more frequent intake of fruits, animal-source foods, and dairy products. These disparities reflect the influence of urbanization, income, and food accessibility, highlighting a gradual transition toward more diversified diets in urban settings. Given the role of demographic factors such as age in shaping feeding habits, it is essential to develop targeted strategies that promote balanced and adequate nutrition across all age groups and locations. This can be achieved by encouraging urban businesses and organizations to invest in rural agriculture, thereby enhancing household income, employment, and food affordability. Additionally, nutrition education programs should be implemented to raise awareness about healthy eating practices, particularly among rural communities and older adults. Finally, interventions should be designed to respect local cultural traditions to ensure widespread acceptance and sustainability.

REFERENCES

Adegboye, O. R., Smith, C., Anang, D., & Musa, H. (2016). Comparing and contrasting three cultural food customs from Nigeria and analysing the nutrient content of diets from these cultures with the aim of proffering nutritional intervention. *Critical Reviews in Food Science and Nutrition, 56, 2483–2494.*

Afe Babalola University & Ekiti State Government. (2022). *A state-based policy document on food insecurity for poverty eradication*

De Brauw, A., & Herskowitz, S. (2018). Income variability, evolving diets, and demand for processed foods in Nigeria (*IFPRI Discussion Paper 01793). International Food Policy Research Institute*.

FAO. (2013): Guidelines for Measuring Household and Individual Dietary Diversity. Rome*: Food and Agriculture Organization.*

Fawole, B. E., and Aderinoye-Abdulwahab, S. A. (2021). "Farmers' adoption of climate smart practices for increased productivity in Nigeria," *in African Handbook of Climate Change Adaptation, eds N. Oguge, D. Ayal, L. Adeleke, and I. da Silva (Cham: Springer). doi: 10.1007/978-3-030-45106-6_227*.

HLPE. (2017). Nutrition and food systems: A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome: FAO.

Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A., & Masters, W. A. (2020). Cost and affordability of healthy diets across and within countries. *Background paper for the*

state of food security and nutrition in the world 2020. Rome: FAO.

Ihedioha, J. N., Abugu, H. O., Ujam, O. T., and Ekere, N. R. (2021). Ecological and human health risk evaluation of potential toxic metals in paddy soil, rice plants, and rice grains (Oryza sativa) of Omor Rice Field, Nigeria. Environ. Monit. *Assess. 193, 1–17. doi: 10.1007/s10661-021-09386-3.*

Islam, M. R., Trenholm, J., Rahman, A., Pervin, J., Ekström, E. C., & Rahman, S. M. (2019). Sociocultural influences on dietary practices and physical activity behaviors of rural adolescents: *A qualitative exploration.* Nutrients, 11*(12), 2916. https://doi.org/10.3390/nu11122916*.

Mekonnen, D. A., Akerele, D., Achterbosch, T., de Lange, T., & Talsma, E. F. (2021). Affordability of healthy and sustainable diets in Nigeria. Frontiers in Sustainable Food Systems, 5, 726773.

Mekonnen, D. A., Trijsburg, L., Achterbosch, T., Brouwer, I. D., Kennedy, G., Linderhof, V., Ruben, R., & Talsma, E. F. (2021). Food consumption patterns, nutrient adequacy, and the food systems in Nigeria. *Agricultural and Food Economics, 9(1), 16.*

Mekonnen, D. A., Trijsburg, L., Achterbosch, T., Brouwer, I. D., Kennedy, G., Linderhof, V., Ruben, R., & Talsma, E. F. (2021). Food consumption patterns, nutrient adequacy, and the food systems in Nigeria. *Agricultural and Food Economics, 9, 16,* **p. 11**. https://doi.org/10.1186/s40100-021-00188-2

Uduma, B. U., Samson, O. A., and Mure, U. A. (2016). Irrigation potentials and rice self sufficiency in Nigeria: *a review. Afr. J. Agric. Res. 11, 298–309. doi: 10.5897/AJAR2015.10284.*

IMPACTS OF WET STRESS ON COCOA PRODUCTIVITY IN SOUTH-WEST STATES OF NIGERIA

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ABSTRACT

Cocoa production faces significant challenges from climate change, leading to either high or less regular rainfall resulting in wet or dry stress among other climate impacts, hence the need to evaluate the impact of wet stress on cocoa productivity in southwest states of Nigeria for climate adaptive agriculture. Data on wet stress impacts on cocoa productivity in six (6) States which include Ekiti, Ondo, Osun, Ogun, Oyo and Lagos were extracted from African Agriculture Adaptation (AAA) Atlas, and the impact of different wet stress scenario (historic, ssp245 and ssp585) on cocoa productivity in the 6 states were evaluated. The findings indicate that wet stress significantly influenced cocoa yields, with considerable variations observed across different states with Oyo recording the lowest value of production. The study recommends adopting climate-smart cocoa farming techniques, investing in early warning systems, and developing state-specific adaptation plans to enhance cocoa farmers' resilience to wet stress. By implementing these strategies, cocoa farmers in South-West Nigeria can mitigate the impacts of climate change and improve their productivity.

Keywords: Wet stress, Cocoa, Climate change, Climate-smart agriculture, Resilience

INTRODUCTION

Cocoa, a major foreign exchange earner is of great importance for the livelihood of millions of small and large holder farmers in Nigeria. It serves as a major source of income, contributing to poverty reduction and economic growth (Olwig *et al.*, 2024). It creates economic opportunities for farmers and various actors along the cocoa value chain (Laven and Boomsma, 2012). However, cocoa cultivation faces significant challenges from climate change, leading to either high or less regular rainfall among other climate impact (Schroth et al., 2016). Climate change which is sometimes referred to as climate variability has become a topical issue globally. This cannot but be attributed to its destructive effects not only on humans but on the world ecosystem. However, rising global temperature especially above the pre-industrial era is not the only result of climate change but there are some other extreme weather events such as fluctuation in rain pattern, droughts, flooding, rising sea level and a range of other impacts (NASA, 2021).

Soil moisture, sometimes called soil water or soil wetness is the total amount of water, including water vapor, in an unsaturated soil. It represents the water in land surfaces that is not in rivers, lakes, or groundwater but resides in the pores of the soil. Cocoa is cultivated as a rain-fed crop and is highly sensitive to soil and weather conditions of high and low rainfall, soil and air moisture deficit, as well as temperature stresses (Mensah et al., 2023). Excess of water is one of the most important factors which affect the physiology and the yielding capacity of cocoa in Nigeria. As it affects leaf production, leaf expansion, leaf fall, cambial growth, flowering, fruit setting, cherelle wilt and pod growth are all affected by the plant-water potential (Ibe et al., 2024). Cocoa cultivation faces significant challenges from climate change, such as high or less regular rainfall among other climate impacts (Schroth *et al.*, 2016). Wet stress as a result of increase in wet conditions especially during the raining season has negative effects on cocoa production. These negative effects could be psychological and economical which eventually lead to lower agricultural productivity.

The main objective of the study is to examine the impacts of wet stress on the productivity of cocoa farmers in South-West Nigeria.

METHODOLOGY

The study was conducted in southwest zone of Nigeria, which include, Ondo, Ekiti, Osun, Oyo, Lagos and Ogun State. Effect of wet stress on Cocoa productivity in Ondo, Ekiti, Osun, Oyo, Lagos and Ogun State all in southwest zone of Nigeria was sampled

This analysis examines how wet stress, a climatic hazard associated with excessive rainfall affects cocoa farmers' productivity across six states (Ondo, Ekiti, Osun, Oyo, Lagos and Oguns) in South-West Nigeria. Data from Africa Agriculture Adaptation Atlas on the cocoa Value of Production (VOP) under historic and projected climate scenarios (*ssp245* and *ssp585*) was extracted and evaluated. The report was used to identify key trends (Timeframe), disparities, and implications of wet stress on cocoa productivity.

The dataset comprises 29 records, covering:

- **States:** Oyo, Osun, Ondo, Ogun, Ekiti, Lagos.

- **Scenarios:** *Historic*, *ssp245* (moderate emissions), *ssp585* (high emissions).
- **Timeframes:***Historic, 2021–2040, 2041–2060*.
- **Crop:** Cocoa.
- **Metrics: VOP** – Value of Production per scenario and timeframe.

The extracted data was analysed using T-test and descriptive statistics

RESULTS AND DISCUSSION

Visual analysis of wet stress impacts

The result of wet stress occurrence in different state in southwest Nigeria (Figure 1) below reveals that Osun and Ondo experience more frequent wet stress events, indicating potential cumulative impacts, although not significantly different from Ekiti, Lagos and Ogun, However, Oyo State has the lowest frequency of wet stress events which is significantly different from other states in the zone.

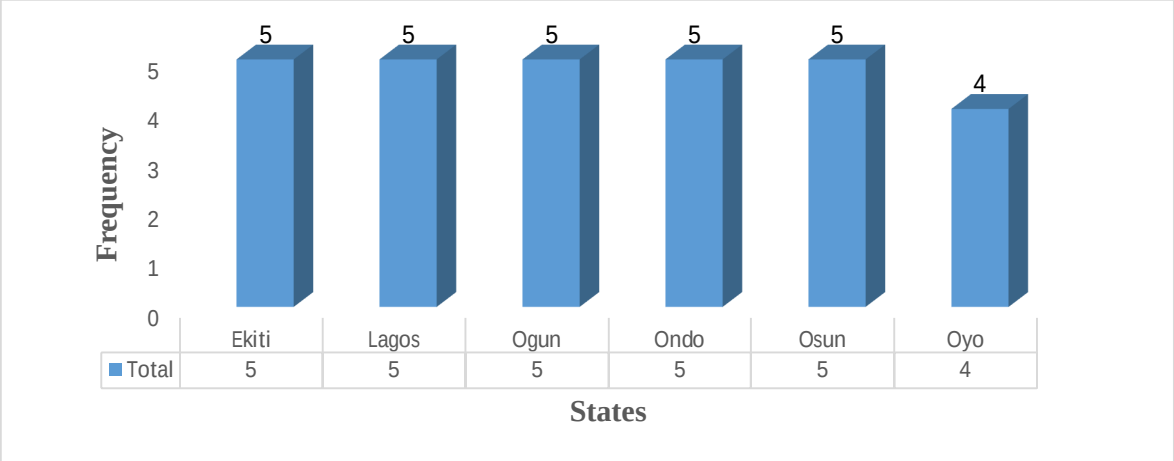

Figure 1: Frequency of incidence of wet stress from states in Southwest Nigeria

Table 1: T-tests on Impact of Climate Scenarios

Comparing *Historic* to future scenarios:

Comparison	Mean Difference	t-statistic	df	p-value	Interpretation
Historic vs ssp245	+550,000	2.85	17	0.0104	Significant increase under ssp245 scenario
Historic vs ssp585	+680,000	3.47	17	0.0028	Highly significant increase under ssp585 scenario

In Table 1 above, both future climate scenarios show significant increases in cocoa production compared to the Historic baseline, with ssp585 having the strongest effect. *ssp*585 vs Historic shows a significant increase in projected VOP ($p < 0.01$) and *ssp*245 vs Historic was moderate but still statistically significant increase ($p < 0.05$). It is an indication that wetter conditions may initially support cocoa growth; however, adaptive strategies are needed to mitigate disease and flooding risks.

CONCLUSION AND RECOMMENDATIONS

The overabundance of water (Wet stress) reduces the capacity of plant for nutrients uptake (macro and micronutrients) from soil. The Reduction of growth and the yield are other symptoms that cocoa trees may be under anoxic condition leading to loss of production, hence reduction in value of productivity. It was therefore recommended that Adoption of climate-smart cocoa farming techniques is necessary to reduce vulnerability to wet stress. Farmers are advised to invest in early warning systems for disease and flooding and develop state-specific cocoa adaptation plans targeting high-risk zones.

REFERENCES

Olwig, M.F., Asare, R., Meilby, H., Vaast, P., Owusu, K., (2024). Agroforestry as climate change

adaptation the case of cocoa farming in ghana. In Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-45635-0

Laven, A., & Boomsma, M., (2012). Incentives for sustainable cocoa production in Ghana Moving from maximizing outputs to optimizing performance. . R. Trop. Inst. 49 (May)

Schroth, G., Laderach, P., Martinez-Valle, A.I., Bunn, C., & Jassogne, L., (2016). Vulnerability to climate change of cocoa in West Africa: Patterns, opportunities and limits to adaptation. Sci. Total Environ.

556, 231–241. https://doi.org/10.1016/j.scitotenv.2016.03.024.

NASA. Global Temperature. (2021). Available from: https://climate.nasa.gov/vital-signs/global-temperature/#:~:text=The%20year%202020%20tied%20with,National%20Oceanic%20and%20Atmospheric%20Administration

Mensah, E. O., Vaast, P., Asare, R., Amoatey, C. A., Owusu, K., Asitoakor, B. K., Ræbild, A. (2023). Cocoa under heat and drought stress. In Agroforestry as Climate Change Adaptation: The Case of Cocoa Farming in Ghana, *Cham: Springer International Publishing*;35-57.

Ibe et. al. (2024): Evaluation of Variations of Rainfall and Other Hydrometeors Across Cocoa Growing State in Nigeria. Book of commemoration of the 60th anniversary Ceremony of the Cocoa Research Institute of Nigeria (1964-2024). Theme: Tree Crops Research for Sustainable Nigeria Economy.

IMPACTS OF CLIMATE VARIABILITY ON CROP YIELD IN SOUTHWESTERN NIGERIA

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ABSTRACT

Agriculture in Southwestern Nigeria is sensitive to climate variability, crop losses without proper monitoring. This study explores how climate variability and hazards impact crop value, using secondary data from the Africa Agriculture Adaptation Atlas. An Adaptive Capacity Index (ACI) was used to examine climate effects on crop yields. Total Value of Production (VOP), Value of Production at Risk (VOPAR), and key socioeconomic indicators, including educational attainment, female empowerment, and poverty levels, were extracted and analysed using percentages, ANOVA, and Duncan's Multiple Range Test. Yams (393.6 to 56.5 million) and Cassava (218 – 160 million) were the most economically valuable crops observed, excluding Lagos, with Maize as the second-highest cash crop. Ekiti State recorded the highest mean VOP at $38.08 million, Ondo State had the highest overall VOP at $50.7 million, and the highest VOPAR at $7 million. Lagos had the lowest VOP ($4.1 million) and VOPAR ($80,553). Climate hazards varied by State; Ondo (72.2%), Ekiti (65.7%), and Osun (50.6%) were predominantly affected by wet conditions, while Oyo (36.8%) and Ogun (21.2%) faced dry hazards. The least exposure was observed in Lagos, having 89.7% of crops unaffected. Ekiti recorded the highest Female Empowerment Index (101.8) and the Highest Poverty rate (53.4%), while Lagos had the lowest poverty rate (14.6%). Educational attainment was highest in Ekiti (10.68 years) and lowest in Oyo (8.21 years). Climate variability threatens crop production in Southwestern Nigeria, and socio-economic conditions shape adaptive responses, thus necessitating the need for climate-smart agriculture and socioeconomic empowerment to strengthen resilience.

Keywords: Adaptive capacity, climate change, crop production, risk, socioeconomic resilience

INTRODUCTION

Agriculture is the backbone of Nigeria's economy, especially in rural areas where livelihoods depend on rainfed farming. In Southwestern Nigeria, the increasing variability of rainfall and temperature has disrupted planting and harvesting cycles, leading to reduced yields and unstable food supply (IPCC, 2021). Climate variability, defined as short- to medium-term deviations from long-term averages, has intensified due to human-induced climate change (FAO, 2016). These fluctuations affect soil moisture and evapotranspiration, thereby impacting crops such as maize, yams, and cassava. Despite efforts to enhance productivity through improved inputs, the persistent challenge of climatic variability remains under-addressed. Furthermore, regional differences in climate responses and yield patterns have not been thoroughly examined with spatially integrated tools. To address these gaps, this study uses the Africa Agriculture Adaptation Atlas, developed by the World Food Programme (WFP) and the UK Met Office, to assess localized climate risks and crop productivity. The study aims to quantify the value of production, measure production at risk, and relate these outcomes to socioeconomic variables, paving the way for tailored, data-driven adaptation strategies.

METHODOLOGY

The study covers the six Southwestern Nigerian states: Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo, spanning latitudes 5°41.2′N–9°19.7′N and longitudes 2°30.2′E–6°06.7′E (Figure 1). The region experiences a tropical wet and dry climate conducive to agriculture, though heavily dependent on seasonal rainfall. Secondary data were obtained from the Africa Agriculture Adaptation Atlas (AAA Atlas), which provides climate and agricultural datasets across Africa. Data extracted included: Value of Crop Production (VOP) and Value of Production at Risk (VOPAR) (in international dollars), Rural population and adaptive capacity indicators (education, gender equality, and poverty levels), Hazard profiles (wet, dry, and compound hazards). Data were aggregated from the local government to the state level, covering scenario SSP245 (1995–2014). The data were analysed using descriptive statistics, Analysis of Variance (ANOVA), and Duncan's Multiple Range Test (DMRT) to compare crop values across states. Relationships among educational attainment, female empowerment, and poverty were also analysed using visualizations such as boxplots and illustrated spatial variability.

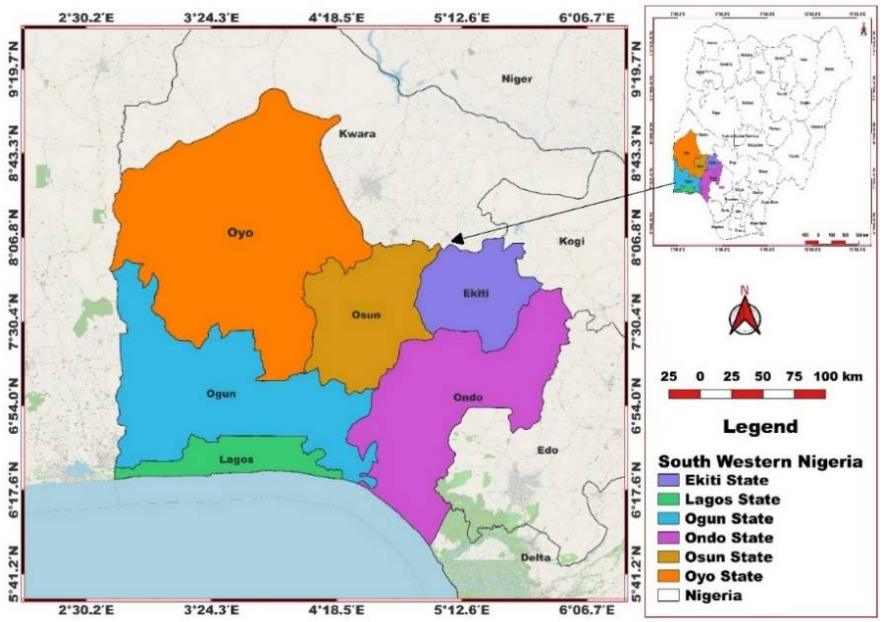

Figure 1: Map of the Study Area (Insets: Map of Nigeria)

RESULTS DISCUSSION

Value of Crop Production (VOP) results indicated that Yams and cassava were the leading crops in terms of economic value. Ekiti State recorded the highest mean yam VOP ($24.6M) and cassava ($10.1M), while Lagos had the lowest. Ondo's overall VOP was the highest ($50.7M), followed by Ogun ($44.5M), with Lagos having the lowest ($4.1M). Statistical tests revealed no significant differences in total VOP among states ($p > 0.05$). The Value of Production at Risk (VOPAR) indicated a significant variation ($p < 0.05$). Ondo recorded the highest mean VOPAR ($7M), followed by Ekiti ($1.8M) and Osun ($1.6M), while Lagos had the lowest ($80,553). However, noticeably, the crops with higher economic value, such as yams and cassava, exhibited greater exposure to climate risks. The climate risk indicated that wet hazards dominated in Ondo (72.2%), followed by Ekiti (65.7%) and Osun (50.6%), while dry hazards were prevalent in Oyo (36.8%) and Ogun (21.2%). Lagos had 89.7% of its crops unaffected by climatic hazards, which could be likely due to urbanization and controlled cultivation systems practiced in the state. The Socioeconomic Indicators indicated that Educational Attainment (EA) was highest in Ekiti (10.68 years) and Lagos (10.18 years), and lowest in Oyo (8.21 years). The Female Empowerment Index (FEI) was also highest in Ekiti (101.8), indicating strong women's participation in agriculture, while Osun had the lowest (54.2). However, Ekiti simultaneously recorded the highest female poverty rate (53.4%), whereas Lagos had the lowest (14.6%), reflecting socioeconomic disparities despite empowerment advances.

The Southwestern Nigerian states comprise Ekiti, Ondo, Lagos, Osun, Oyo, and Ogun States. The Value of Production (VOP) and Value of Production at Risk (VOPAR) were assessed based on data retrieved from the Atlas website, alongside socioeconomic indicators such as Educational Attainment (EA), the proportion of females living in poverty, and the Female Empowerment Index (FEI). A Significant variation was observed in crop VOP across the southwestern states. Yams and cassava were noticeably economically valuable crops in the southwest zone of Nigeria. This was in agreement with Adebayo *et al*. (2020), who reiterated the significance of tuber crops in the regional economy, owing to the adaptability of this crop to climate variability, market demand, and cultural relevance. The highest Value of production was recorded in Yams, across the states, with Ekiti State emerging as the state with the highest yam VOP ($ 393,600,000), followed by cassava. A similar trend was also observed in VOP for yams in Lagos State, which has been reported for its high urban transformation, resulting in limited land availability. This indicates that urban agriculture retains strong ties to traditional crops in the state. These findings agree with the Bureau of Statistics report (2019), as yams and cassava were reported as the most produced crops in the states. The crop VOPAR analysis carried out revealed that Ondo State recorded the highest VOPAR at above $ 7 million, followed by Ekiti and Osun States. The crop VOPAR was observed to be at its highest on crops with the highest economic values across the southwestern states, as these crops are the most exposed to production shocks. This agrees with Ayanlade *et al*. (2009), who linked high-value, rain-fed crop yields

with varying anomalies in the Middle Belt of Nigeria. Hazard exposure patterns in the southwest further elucidate the regional risk differences. Ondo State was attributed with wet hazards of about 72.2%, Ekiti (65.3%), and Osun State with 50.6%. The dry hazards were more prevalent in Oyo State (36.8%) and Ogun State (21.2%). These patterns observed across the Southwest echo the climate vulnerability typology reported by Salami (2024) on the complexity of Nigeria's rainfall pattern, which poses significant environmental risks and agricultural opportunities due to its notable increase and decline. Lagos state had 89.7% of the crops remain unaffected by hazards. This could be a result of urban infrastructure and controlled agricultural environments, thus reducing the crop's exposure to both wet and dry extreme hazards. On the socioeconomic factors, educational attainment (EA) scores were relatively high and statistically similar across Osun, Ondo, Lagos, and Ekiti. This reflects the strong educational foundations in the Southwest of Nigeria. This aligns with UNESCO (2020) data, placing the southwestern states at the top in terms of literacy and school completion rates as compared to other geopolitical zones in Nigeria. This was also corroborated by Olufemioladebinu *et al*. (2018) findings, where about 64.2% of their respondent had good academic achievement in southwest Nigeria. However, Oyo and Ogun recorded significantly lower EA scores, which may slightly hinder technology adoption and innovation in agriculture, posing challenges for long-term resilience in the state. Varying disparities were observed in the female empowerment index (FEI) and poverty rates among women across southwestern Nigeria. Ekiti state was observed to have the highest FEI (101.18), which is an indication of strong female participation in the agricultural value chain and decision-making process in the state, thus highlighting the likely possibility of Ekiti's gender inclusion in its state policies. Meanwhile, the number of females who lived in poverty was highest in Ekiti State, while the lowest was observed in Lagos State. This reflects structural inequalities. Adepoju and Yusuf (2011) reported similar regional disparities in the vulnerability profile of rural households in South Western Nigeria.

CONCLUSION AND RECOMMENDATIONS

Climate variability poses a significant threat to crop production in Southwestern Nigeria, with yams and cassava being the most affected crops. Spatial variations in hazard exposure reveal that wet conditions dominate the coastal and central states, while dry hazards affect inland areas. Socioeconomic differences, particularly in education, gender empowerment, and poverty, influence farmers' adaptive capacities. This study, however, recommends the promotion of climate-smart agriculture, including drought- and flood-tolerant crop varieties, investment in rural education and female empowerment to enhance decision-making and technology adoption, and thereby integrating climatic and socioeconomic data, and formulation of policy in reducing production risks, which will also foster sustainable and inclusive agricultural growth.

REFERENCES

Adebayo, W. G., and Silberberger, M. (2020). Poverty reduction, sustainable agricultural development, and the cassava value chain in Nigeria. Palgrave Handbook of Agricultural and Rural Development in Africa.

Adepoju, A. O., and Yusuf, S. A. (2011). Vulnerability profile of rural households in South West Nigeria. Journal of Agricultural Science, 3(1), 128.

Ayanlade, A., Odekunle, T. O., Orinmogunje, O. I., and Adeoye, N. O. 2009. Inter-annual climate variability and crop yield anomalies in the Middle Belt of Nigeria. *Adv Nat Appl Sci, 3*.3:452-65.

FAO. (2016). Climate Change and Food Security: Risks and Responses.

IPCC. (2021). Climate Change 2021: The Physical Science Basis. Cambridge University Press.

Olufemioladebinu, T., Adediran, A. A., and Oyediran, W. O. (2018). Factors influencing the academic achievement of students in Colleges of Education in Southwest, Nigeria. *Journal of Education and Human Development*, *7*(3), 109-115.

Salami, A. A. (2024). Rainfall variability and trends analyses in Nigeria. Earth Systems and Environment.

UNESCO (2020). *Education profile of Nigeria*: https://uis.unesco.org/en/country/ng

WFP and UK Met Office. (2019). Atlas of Climate Risk and Food Security in Africa.

EFFECTS OF HEAT STRESS, EDUCATION, AND FAMILY PLANNING ON WOMEN FARMERS' REPRODUCTIVE HEALTH IN NIGERIA

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ABSTRACT
Historically, human activities have intensified environmental pressures, leading to increased climate heat stress that threatens women's reproductive health. This study examines the effects of heat stress, education, and family planning on women's reproductive health in agriculture in Nigeria. Secondary data were obtained from the Africa Agriculture Adaptation Atlas (AAA ATLAS) covering both historical and SSP585 projected datasets. Linear regression was employed for the analysis, and the Variance Inflation Factor (VIF) was used as a diagnostic test to check for multicollinearity. The regression results showed that education ($p<0.01$), and family planning ($p<0.10$) showed positive effect while heat stress had a negative but not significant on women reproductive health over time. The mean VIF values of 4.65 and 4.71 shows no multicollinearity among the explanatory variables. The study recommends strengthening education and reproductive health programs for women in agriculture, as well as adopting climate-sensitive health policies to mitigate future emerging risks.
Keywords: Women in agriculture, Reproductive Health, Family Planning, Education, Heat Stress, AAA Atlas, Nigeria.

INTRODUCTION

Heat stress directly affects human health by reducing the body's ability to regulate internal temperature (Kuehn and McCormick, 2017), and when accompanied by humidity, the body's ability to dissipate heat through sweating and evaporation becomes impaired (Adeniyi and Oyekola, 2017) leading to heat exhaustion or even heat stroke. (Kuehn and McCormick, 2017).

While heat stress affects the reproductive functioning of both males and females (Ibrahim *et al*., 2025), women have increased nutritional requirements during pregnancy, which heighten their vulnerability to climate-sensitive health risks (Desai and Zhang, 2021). Compared to men, women have a lower capacity for heat dissipation through perspiration, a higher metabolic workload, and a thicker subcutaneous fat layer, all of which contribute to reduced cooling efficiency (Özten and Keleş, 2024). These physiological factors not only increase women's risk of heat-related illness but also compound the challenges they face in hot climates, particularly during pregnancy or in environments with limited access to healthcare, inadequate infrastructure, poor sanitation, and minimal financial or institutional support for climate adaptation (Anjum and Aziz, 2025). Women make up 75% of Nigeria's agricultural workforce yet they often have lower levels of education and face harsh working conditions (Food and Agriculture Organization, 2023; Ifeanyi-obi, 2023). Kunda *et al*. (2024) confirms that agricultural workers are among the most exposed to rising temperatures making female agricultural laborers particularly vulnerable to heat stress. One of the key constraints these women face is limited education, which restricts their ability to make informed reproductive health decisions and undermines their autonomy, especially among younger women (Fernandes *et al.*, 2025). Strengthening girls' education therefore serves as a critical pathway to empowerment and resilience. Evidence from Kwauk and Braga (2017) shows that for every additional year of schooling a girl receives, her country's vulnerability to climate-related disasters decreases by 3.2 points, highlighting the broader societal benefits of educating women. Moreover, investing in girls' education together with expanding access to family planning services, enhances reproductive health, promotes gender equality, and strengthens adaptive capacity in climate-stressed hotspots (Starrs *et al.*, 2018). Although health, education, gender equality, and climate action are all emphasized in the Sustainable Development Goals 3, 4, 5, and 13, progress is still slow and hindered by a lack of political will, insufficient funding, and persistent gender disparities (Starrs *et al*., 2018). This study, which explores the interlinkages between heat stress, education, and family planning in shaping women farmers' reproductive health, offers a valuable framework for policymakers in designing targeted interventions for women in Nigeria.

METHODOLOGY

The scope of the study is Nigeria. The study used historical and projected data obtained from the AAA ATLAS. Linear regression was used to assess the effects of heat stress, education, and family planning on reproductive health of women in agriculture in Nigeria using STATA 17. According to Ghorbani *et al*. (2021), linear regression was used

to identify variables that are predictors. Explicitly, the study described the model mathematically as:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad \ldots (1)$$

Where y represents reproductive health, X_1 = Heat stress, X_2 = Education, X_3 = Family Planning, and ε = error term.

RESULTS AND DISCUSSION

Table 1 presents the regression estimates on the effects of heat stress, education, and family planning on women's reproductive health using historical and projected data. The results are consistent in both models, with varying levels of explanatory power. The model shows a very strong fit with R-squared values of 0.79, indicating that the independent variables account for 79% of the variation of reproductive health of women in agriculture. The p<0.01 for the F-statistics further confirms that the overall model is statistically significant.

The coefficient of heat stress is negative but insignificant in both models, suggesting that higher exposure may lead to a decline in women's reproductive health. The lack of statistical significance may be due to unobserved mediating variables not captured in AAA ATLAS. In contrast, education consistently shows a positive relationship with women's reproductive health in both time trends (p<0.01). This highlights the important role of female education in improving reproductive health in Nigeria. These results align with those of Samarakoon and Parinduri (2014) and Sanjuan-Meza *et al.* (2019), which suggest that education promotes reproductive health practices. Educated women are more informed about reproductive behaviors and make better decisions regarding family planning and maternal care. Access to family planning also showed a positive relationship with women's reproductive health in agriculture in Nigeria, at p < 0.10 across both time trends. This supports the idea that family planning programs help enhance reproductive health, likely through the use of contraceptives, reducing fertility rates, and better birth spacing to increase their productivity in agricultural task. The results corroborate with Hussain and Lefta (2020) that there is a significant relationship between knowledge (education), family planning, and women's reproductive health.

Table 1: Effects of Heat stress, Education, and Family Planning on Reproductive Health among Women in Agriculture.

		(Historic)			(Projection)	
Variables	**Coefficient**	**Std Err.**	**P>|t|**	**Coefficient**	**Std Err.**	**P>|t|**
Heat stress	-0.0125	0.0107	0.252	-0.0126	0.0092	0.177
Education	0.4283	0.1470	0.006***	0.4432	0.1474	0.005***
Family Planning	0.2823	0.1628	0.092*	0.2768	0.1614	0.095*
_cons	0.6960	0.3622	0.063	0.7368	0.3358	0.035
No of Observation	38			38		
R- squared	0.7935			0.7966		
Adjusted R-squared	0.7753			0.7787		
Prob> F	0.0000			0.0000		

***, **, * indicate significance at 1%, 5%, and 10% level respectively.
Source: Author's computation (2025)

For robustness check of the regression results, Table 3 shows the result (4.65 and 4.71) of the Variance Inflation Factor (VIF) diagnostics which was conducted to assess the degree of multicollinearity among the variables. According to Hair et al. (2018), if the mean value of the VIF is less than 5, there is low collinearity and the value is considered not to affect the regression results.

Table 2: VIF diagnostics on the independent variables.

Variables	**(Historic)**		**(Projection)**	
	VIF	**1/VIF**	**VIF**	**1/VIF**
Education	6.53	0.153091	6.66	0.150204
Family Planning	6.34	0.157822	6.32	0.158206
Heat stress	1.09	0.919724	1.14	0.879745
Mean VIF	4.65		4.71	

Source: Author's computation (2025)

CONCLUSION AND RECOMMENDATION

The study examined the effects of heat stress, education, and access to family planning on women's reproductive health in Nigerian agriculture. Regression results confirmed education and family planning as key positive determinants of reproductive health whereas heat stress showed a negative relationship and not statistically significant, suggesting potential long-term effects. Targeted interventions are essential to improve reproductive

health outcomes among women in agriculture in Nigeria. Policies should focus on expanding female education and access to family planning services. Additionally, climate-sensitive health planning is crucial, particularly in areas expected to face higher heat stress. Enhancing healthcare infrastructure and awareness campaigns in vulnerable communities will be vital for overcoming social and environmental barriers to women's reproductive health and promoting equitable health development in Nigeria.

REFERENCES

Adeniyi, M. O., and Oyekola, S. O. (2017). Assessment of heat and cold wave events over West Africa using three regional climate models. *Annals of Geophysics*, *60*(3). https://doi.org/10.4401/ag-7039

Anjum, G., and Aziz, M. (2025). Climate change and gendered vulnerability: A systematic review of women's health. *Women's Health (London, England)*, *21*, 17455057251323644. https://doi.org/10.1177/17455057251323645

Desai, Z., and Zhang, Y. (2021). Climate Change and Women's Health: A Scoping Review. In *GeoHealth* (Vol. 5, Issue 9). John Wiley and Sons Inc. https://doi.org/10.1029/2021GH000386

Fernandes, D. S., Bhat, S. K., Inamdar, N., and Kamath, V. G. (2025). A Qualitative Study of Key Informants' Perceptions of Factors Influencing Women's Reproductive Autonomy. *Sexuality and Culture*. https://doi.org/10.1007/s12119-025-10349-w

Food and Agriculture Organization. (2023). The status of women in agrifood systems. In *The status of women in agrifood systems*. FAO. https://doi.org/10.4060/cc5343en

Ghorbani-Dehbalaei, M., Loripoor, M., and Nasirzadeh, M. (2021). The role of health beliefs and health literacy in women's health promoting behaviours based on the health belief model: a descriptive study. *BMC women's health*, *21*(1), 421. https://doi.org/10.1186/s12905-021-01564-2

Hair, J.F, Black, W.C, Babin B.J, and Anderson R.E (2018). Multivariate Data Analysis, 7th ed. Pearson Education limited. Essex, UK

Hussain, A., and Lefta, R.M. (2020). Influence Factors Utilisation of Family Planning Services among Reproductive Age Women's in Primary Health Care. *Indian Journal of Forensic Medicine and Toxicology*

Ibrahim, M., Olanrewaju Garuba, W., Popoola, A., Gafar Niyi Popoola, A., and Ayodeji Mustapha, A. (2025). Reproductive Hormone Profiles and Infertility Risk in Heat-Exposed Female Kitchen Workers in Ilorin, Nigeria. *International Journal of Research and Scientific Innovation (IJRSI)*, *6*(6). https://doi.org/10.51244/IJRSI

Ifeanyi-obi, C. C. (2023). How are Rural Women Crop Farmers in Southern Nigeria Coping with Climate Change. *FARA Research Report*, *7*(39), 497. https://doi.org/10.59101/frr072339

Kuehn, L., and McCormick, S. (2017). Heat exposure and maternal health in the face of climate change. In *International Journal of Environmental Research and Public Health* (Vol. 14, Issue 8). MDPI. https://doi.org/10.3390/ijerph14080853

Kunda, J. J., Gosling, S. N., and Foody, G. M. (2024). The effects of extreme heat on human health in tropical Africa. In *International Journal of Biometeorology* (Vol. 68, Issue 6, pp. 1015–1033). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/s00484-024-02650-4

Kwauk, C., and Braga, A. (2017). *Three platforms for girls' education in climate strategies* (6; Brooke Shearer Series, Issue 6).

Özten, İ., and Keleş, N. Ç. (2024). The Effects of Climate Change on Maternal, Fetal and Neonatal Health: An In-Depth Review. In *Eurasian Journal of Health Technology Assessment (EHTA)* (Vol. 8, Issue 1). https://orcid.org/0000-

Sanjuan-Meza, X. S., Padrón-Salas, A., Valle-Luna, P., Martínez-Granada, S., Ortega-Velázquez, A., and Cossío-Torres, P. (2019). Reproductive health education program for Mexican women. *The European Journal of Contraception and Reproductive Health Care*, *24*(5), 373–379. https://doi.org/10.1080/13625187.2019.1656187

Samarakoon, S., and Parinduri, R. A. (2014). Does Education Empower Women? Evidence from Indonesia. *World Development*, *66*, 428–442. https://doi.org/10.1016/j.worlddev.2014.09.002

Starrs, A. M., Ezeh, A. C., Barker, G., Basu, A., Bertrand, J. T., Blum, R., Coll-Seck, A. M., Grover, A., Laski, L., Roa, M., Sathar, Z. A., Say, L., Serour, G. I., Singh, S., Stenberg, K., Temmerman, M., Biddlecom, A., Popinchalk, A., Summers, C., and Ashford, L. S. (2018). Accelerate

progress—sexual and reproductive health and rights for all: report of the Guttmacher–Lancet Commission. In *The Lancet* (Vol. 391, Issue 10140, pp. 2642–2692). Lancet Publishing Group. https://doi.org/10.1016/S0140-6736(18)30293-9

IMPACT OF HEAT STRESS ON WOMEN'S PARTICIPATION IN CROP PRODUCTION IN NIGERIA

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ABSTRACT

Heat stress, intensified by climate change, poses significant risks to agriculture and rural livelihoods in Nigeria, with women who constitute a large share of the agricultural workforce particularly vulnerable. This study examined the spatial and temporal distribution of heat stress across Nigeria and its implications for women's participation in agriculture. Geospatial datasets from the CGIAR Adaptation Atlas were processed to generate heat stress indices, which were classified into low (30.38–32.38 °C), medium (32.38–34.56 °C), and high (34.56–37.83 °C) categories. Results showed that Lagos recorded the highest heat stress (37.83 °C), while states such as Delta, Bayelsa, Rivers, Borno, Kebbi, Sokoto, Ogun, and Edo also experienced high stress levels. Hotspots combining heat stress and agricultural exposure were identified in Delta, Benue, Rivers, Kano, and Borno, whereas cooler zones were found in Plateau, Taraba, and Ekiti. Analysis of female participation revealed highest counts in Benue (543,178), Rivers (490,443), Niger (488,369), Lagos (453,290), and Plateau (417,667), with the lowest in Zamfara, Kebbi, Sokoto, Jigawa, and Ekiti. Pearson correlation between heat stress and female participation produced $r = -0.0068$ ($p = 0.9681$), indicating no significant linear relationship. Nevertheless, the overlap of high heat stress and dense female agricultural labor highlights localized risks. The study recommends gender-responsive adaptation measures such as climate-smart agriculture, women-led cooperatives, improved access to finance, and resilient infrastructure to safeguard livelihoods and advance progress toward SDGs 2, 5, and 13.

Keywords: Heat stress, Women in agriculture, Geospatial analysis, Climate change, Nigeria

INTRODUCTION

Climate change continues to pose significant challenges to agricultural productivity globally, particularly in developing countries where smallholder farmers rely heavily on rain-fed systems (IPCC, 2021). One of the most critical manifestations of this phenomenon is heat stress, which has become a growing concern for agricultural workers in tropical regions such as Nigeria (Nwafor & Okoli, 2020). Heat stress occurs when the human body absorbs more heat than it can dissipate, leading to physiological strain and reduced performance (Kjellstrom et al., 2016). In the agricultural sector, this condition not only affects productivity but also influences labor allocation, working hours, and overall participation, especially among vulnerable groups such as women (ILO, 2019). Women constitute a significant proportion of the agricultural labor force in Nigeria, engaging in various aspects of crop production ranging from land preparation to harvesting (FAO, 2020). However, their participation is often shaped by environmental and socio-economic factors, including exposure to adverse climatic conditions (Adeniyi et al., 2022). The rising incidence of heat stress has been reported to disproportionately affect women due to biological, social, and occupational differences in workload and access to adaptive resources (Opoku et al., 2021). Consequently, understanding the impact of heat stress on women's participation in crop production is vital for achieving gender-sensitive climate resilience strategies (UN Women, 2022).

Studies across sub-Saharan Africa have revealed that extreme heat events are increasingly influencing agricultural productivity and labor dynamics, with Nigeria recording some of the highest heat index values in West Africa (NIMET, 2023). This has led to a reduction in work duration, productivity losses, and even health-related absenteeism during peak farming periods (Ajayi & Fasona, 2019). While considerable research has focused on the effects of climate variability on crop yield, limited attention has been paid to how heat stress directly affects women's active participation in agricultural production (Yila & Resurreccion, 2019). Addressing this gap is essential to ensure equitable climate adaptation planning and sustainable food systems.

Therefore, this study seeks to examine the impact of heat stress on women's participation in crop production in Nigeria, with the aim of understanding the extent to which heat exposure influences their productivity, working conditions, and adaptive responses to climate-induced temperature extremes.

METHODOLOGY

Nigeria, located in West Africa between latitudes 4° N–14° N and longitudes 3° E–15° E, occupies an estimated land area of 923,769 km² and shares boundaries with Benin to the west, Niger to

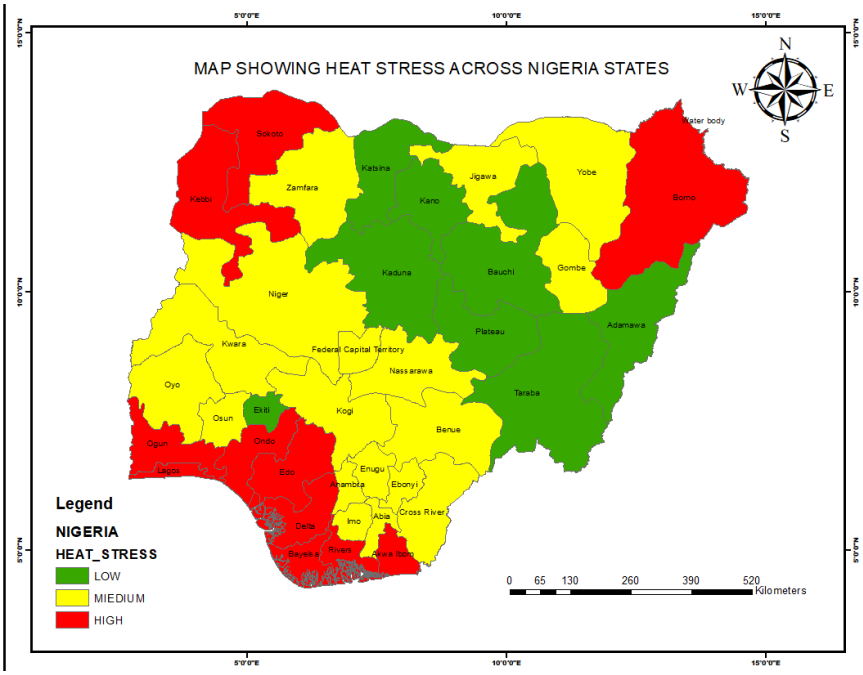
the north, Chad to the northeast, Cameroon to the east, and the Atlantic Ocean to the south. The country is characterized by diverse climatic zones ranging from humid rainforest in the south to semi-arid Sahel in the north, with mean annual temperatures between 25 °C and 37 °C (NIMET, 2022). These climatic gradients, together with variations in elevation and vegetation from mangroves and rainforests to savanna grasslands create strong spatial contrasts in environmental conditions (Areola, 1983). Agriculture remains the dominant livelihood, engaging over 70 % of the population, with women forming a substantial proportion of the agricultural workforce, particularly in smallholder crop production (FAO, 2021). Such ecological and socioeconomic heterogeneity provides an ideal framework for assessing regional differences in heat exposure and women's participation in agriculture.

This study employed a quantitative geospatial approach integrating climatic and socioeconomic datasets to examine the relationship between heat stress and women's participation in crop production across Nigeria. Heat-related indicators were obtained from the CGIAR Climate Adaptation Atlas (CGIAR, 2023), an open-access platform providing spatial data on temperature anomalies, heat-stress exposure, and adaptive capacity for Africa.. Administrative boundary shapefiles were obtained from the Global Administrative Areas (GADM) database. Raster data on land surface temperature were processed in ArcGIS Pro 3.0. The heat-stress index was classified using the Natural Breaks (Jenks) method into three categories: Low (30.38–32.38 °C), Medium (32.38–34.56 °C), and High (34.56–37.83 °C). State-level zonal statistics were computed to derive mean heat-stress values, which were then integrated with women's agricultural participation data. Descriptive and inferential statistics, including Pearson correlation and ordinary least squares regression, were employed to explore the relationship between heat intensity and women's involvement in crop production. Validation of the satellite-derived temperature data was carried out using long-term ground observations from NIMET, yielding a root-mean-square error of ±1.5 °C. All datasets were projected to the WGS 1984 UTM Zone 32 N coordinate system for spatial consistency. The analysis maintained gender-sensitive interpretation, recognising differential exposure and adaptive capacity among women farmers.

RESULTS AND DISCUSSIONS

Spatial distribution of heat stress in relation to women in agriculture

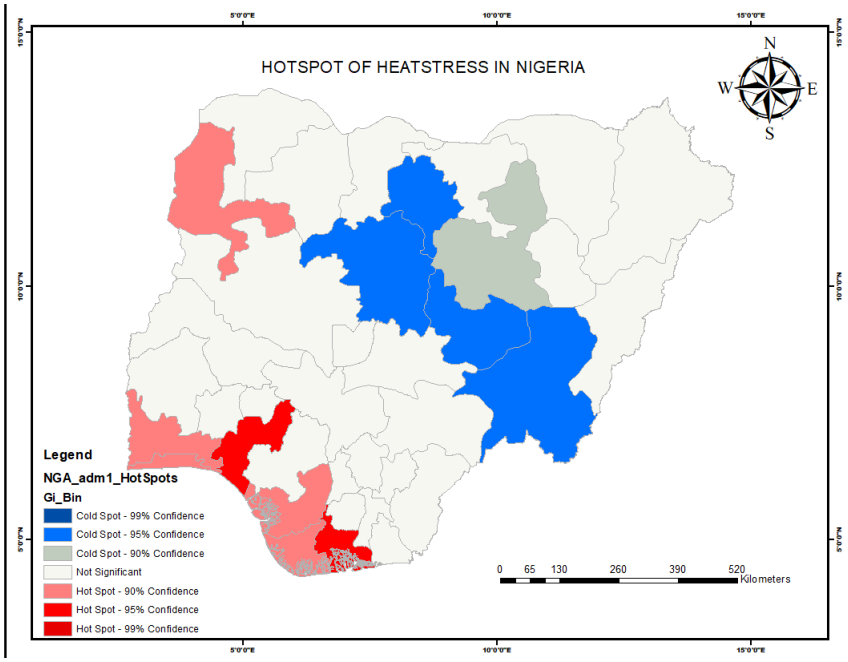
The spatial pattern of heat stress across Nigeria shows clear regional variations that reflect the country's climatic and environmental diversity. Heat stress was classified into three levels using natural breaks: Low (30.38°C–32.38°C), Medium (32.38°C–34.56°C), and High (34.56°C–37.83°C). States under high heat stress including Bayelsa, Delta, Lagos, Rivers, Borno, Kebbi, Akwa Ibom, Sokoto, Ogun, and Edo record the most extreme thermal conditions, with Lagos reaching 37.83°C. These areas, concentrated in both the humid South-South coast and the arid North, face rising vulnerability to extreme heat. Female farmers in these regions are especially at risk of heat-related illnesses, fatigue, and productivity decline. Urbanized states such as Lagos and Rivers further experience urban heat island effects, which intensify thermal exposure for peri-urban and informal women farmers. The medium heat stress category covering states like Abia, Anambra, Benue, Cross River, Imo, Kwara, Niger, Oyo, and others span much of the central and southeastern zones. Although not at extreme levels, persistent exposure in these areas can still impair women's health and efficiency, particularly given widespread rural poverty and limited adaptation infrastructure. States with low heat stress, including Kaduna, Ekiti, Plateau, Kano, Katsina, Bauchi, Adamawa, Enugu, and the FCT, benefit from higher elevations and vegetation cover that help moderate temperatures. The presence of some northern states in this category suggests that elevation, topography, and land use strongly influence local heat patterns. Nevertheless, rising national temperature trends highlight the need for proactive adaptation measures even in these currently low-risk zones.



Hotspot of heat stress in the agricultural zones in Nigeria

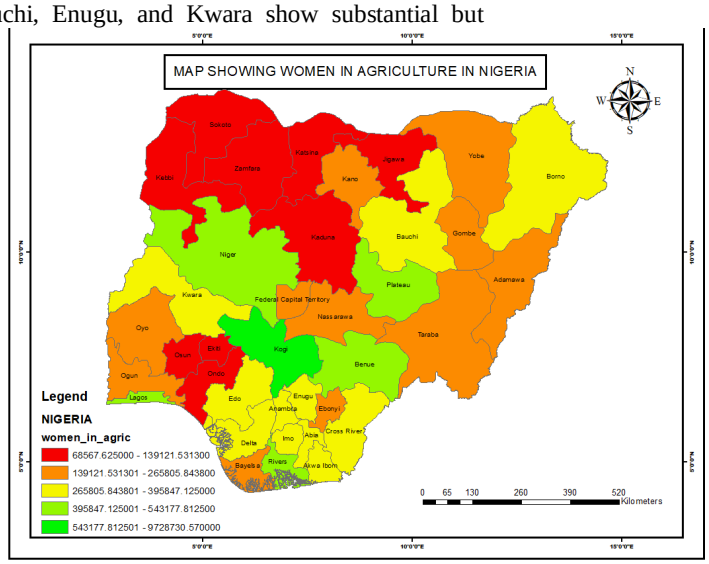
The analysis of heat stress across Nigeria highlights distinct patterns of hotspots and cool spots, revealing critical insights into the geographical distribution of heat exposure and its implications for women's participation in agriculture. The identified hotspots, marked in orange and red on the map, include states such as Delta, Benue, Rivers, Kano, and Borno. These regions experience significant heat stress due to a combination of high humidity and elevated temperatures, which adversely affect agricultural productivity and the health of female farmers. For instance, Delta State and Rivers State, both located in the southern region, are characterized by urbanization and climatic conditions that exacerbate heat stress, consequently posing challenges for women engaged in labour-intensive farming activities. Similarly, Kano and Borno in the northern region face considerable heat exposure, compounding the difficulties for women farmers who are already vulnerable due to socio-economic factors.

In contrast, the analysis also identifies cool spots, indicated in blue, where heat stress exposure is comparatively lower. Notable examples include Plateau State and Taraba State, located in the northern highlands, which benefit from milder temperatures due to their elevation. These regions offer a more favourable environment for agricultural activities and present opportunities for women to engage in farming with reduced health risks associated with heat stress. Ekiti State, situated in the southwestern region, also exhibits lower heat stress levels, suggesting that its ecological conditions contribute to a more conducive agricultural environment.



Heat stress on women's participation in crop production in Nigeria.

The spatial analysis of women's participation in agriculture across Nigeria shows clear regional disparities driven by agro-ecological, socio-cultural, and institutional factors. Benue State recorded the highest number of women engaged in agriculture (543,177.8), followed by Rivers (490,443.2), Niger (488,368.9), Lagos (453,290.2), Plateau (417,667.3), Anambra (395,847.1), and Delta (394,597.4). These states combine fertile lands, agrarian economies, and better access to markets and agricultural support systems making them central to Nigeria's food production and highlighting the critical role women play in smallholder farming and processing. States with moderate participation including Abia, Cross River, Adamawa, Borno, Imo, Bauchi, Enugu, and Kwara show substantial but comparatively lower engagement levels. Factors such as poor access to inputs, inadequate infrastructure, insecurity in the North-East, and socio-cultural constraints likely limit women's agricultural involvement in these regions. The lowest participation levels are found in Zamfara (68,567.6), Kebbi (78,329.8), Sokoto (86,027.2), Jigawa (95,509.8), and Ekiti (93,374.7). Deep-rooted gender norms, limited literacy, and restricted land ownership rights are key barriers, particularly in the North-West. Interestingly, Ondo (133,842.6) and Osun (134,375.1) both in the more urbanized South-West also fall within this low category, likely due to rising urbanization, livelihood diversification, and shifting aspirations among younger women.



CONCLUSION AND RECOMMENDATIONS

This study analysed the spatial distribution of heat stress across Nigeria and its implications for women's participation in crop production using data from the CGIAR Climate Adaptation Atlas. Results revealed clear spatial disparities, with Lagos, Delta, Bayelsa, Rivers, and Borno experiencing the highest heat stress, while Plateau, Kaduna, and Ekiti showed milder conditions. However, correlation analysis indicated a weak relationship between heat stress and women's participation, suggesting that socio-economic factors play a stronger role in influencing agricultural involvement.

Heat stress remains a growing climate risk across Nigeria, intensifying existing gender-based vulnerabilities. Although it does not directly determine women's engagement in agriculture, increased exposure to extreme heat threatens their productivity, health, and income security. Integrating gender perspectives into climate adaptation policies is therefore critical for sustainable agricultural development.

The study recommends targeted interventions in high-risk regions, including improved irrigation, shaded workspaces, and gender-responsive climate-smart training. Strengthening women's cooperatives and access to agricultural inputs will further enhance adaptive capacity. Continuous monitoring and sex-disaggregated data collection are also essential to inform inclusive and evidence-based climate policies.

REFERENCES

Adeniyi, O. A., Ayanlade, A., & Adebayo, T. A. (2022). Gendered impacts of climate change on agricultural productivity in Nigeria. *Journal of Climate and Development Studies*, 14(2), 45–59.

Ajayi, V. O., & Fasona, M. J. (2019). Heat exposure and labour productivity in agricultural communities of Nigeria. *Environmental Research Communications*, 1(9), 095004.

Areola, O. (1983). The spatial growth of Ibadan city and its impact on the rural hinterland. *Inaugural Lecture Series*, University of Ibadan Press.

CGIAR. (2023). *Climate Adaptation Atlas*. Consultative Group on International Agricultural Research (CGIAR). Retrieved from https://adaptationatlas.cgiar.org

FAO. (2020). *The State of Food and Agriculture 2020: Overcoming water challenges in agriculture*. Food and Agriculture Organization of the United Nations, Rome.

FAO. (2021). *Gender and agriculture in Nigeria: Policy brief*. Food and Agriculture Organization of the United Nations, Rome.

ILO. (2019). *Working on a warmer planet: The impact of heat stress on labour productivity and decent work*. International Labour Organization, Geneva.

IPCC. (2021). *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

Kjellstrom, T., Lemke, B., Otto, M., Hyatt, O., & Briggs, D. (2016). Climate change and occupational heat impacts: A global perspective. *Industrial Health*, 54(4), 337–346.

NIMET. (2022). *Nigerian Meteorological Agency Annual Climate Review Report 2022*. Nigerian Meteorological Agency, Abuja.

NIMET. (2023). *Climate Outlook for Nigeria 2023*. Nigerian Meteorological Agency, Abuja.

Nwafor, J. C., & Okoli, C. F. (2020). Climate variability and thermal stress effects on rural livelihoods in Nigeria. *Journal of Environmental Science and Policy*, 108, 115–126.

Opoku, E., Kemausuor, F., & Nyantakyi, J. (2021). Climate-induced heat stress and gendered vulnerability in sub-Saharan Africa. *Climate and Development*, 13(5), 402–415.

UN Women. (2022). *Gender and climate change: Strengthening women's resilience to climate impacts*. United Nations Entity for Gender Equality and the Empowerment of Women, New York.

Yila, O. M., & Resurreccion, B. P. (2019). Gender perspectives in climate change adaptation: A case of Nigerian women farmers. *Sustainability Science*, 14(3), 667–678.

COMPARATIVE ANALYSIS OF WOMEN'S PARTICIPATION IN MAIZE PRODUCTION AND CLIMATE CHANGE ADAPTATION IN OYO AND BENUE STATES, NIGERIA

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ABSTRACT

Women in agriculture are critical to attaining food security and sustaining food systems. However, they face systemic and climatic barriers such as climate change, insecure land tenure, limited access to finance, improved varieties of crops and extension services. Nigeria's agricultural sector is highly vulnerable to shifting rainfall patterns, rising temperatures, and extreme weather events. These challenges intersect with existing gender inequalities, as women who constitute 60% of the agricultural labour force, especially in subsistence farming and post-harvest processing, are affected. The current food security crisis underscores the urgent need for targeted interventions. Evidence demonstrates that increasing women's empowerment through participation in maize production can reduce severe food insecurity by 4%. Therefore, addressing gender inequalities in agriculture is not merely an ethical imperative but a strategic necessity for national food security and sustainable development. This study used secondary data sourced from the Africa Agriculture Adaptation (AAA) Atlas, thereby providing a comparative analysis of women's participation in maize production and climate adaptation in Oyo and Benue States, Nigeria. The findings inform actionable recommendations aimed at fostering gender-responsive climate resilience for women involved in maize production.

Keywords: Adaptation, Climate change, Maize production, Women

INTRODUCTION

Agriculture is the main source of employment and livelihoods for over seventy percent (74.2%) of Nigeria's population in rural areas (ATLAS Data, 2020). Within rural communities, maize plays a vital role in securing food supplies and generating income. As a staple, maize sustains millions and is a key source of income for Nigerian farmers. The dependence on agriculture, particularly maize, means that vulnerabilities concerning this crop can have ripple effects on food security and the country's economic stability. Maize, being a crop sensitive to temperature-heat stress and water availability, is especially vulnerable to climate variability, which threatens food systems. Hence, disruptions to maize production can lead to widespread food insecurity and economic difficulties for many.

Women contribute immensely to the agri-food system in Nigeria, in terms of food production, processing, and marketing. They comprise a substantial portion of the agricultural labour force, estimated at 41% for land preparation, planting, weeding and 42% for harvesting, and over 60% for food production. Women's involvement is particularly concentrated in labour-intensive activities throughout the agri-food chain, extending beyond production activities to post-harvest processes. In urban areas, women find employment in maize-based food processing, street vending, and retail distribution.

Despite these immense contributions, women in Nigerian agriculture face systemic disempowerment. A striking 93.4% of women in agriculture are disempowered, a stark contrast to 47.4% of men (Obayelu *et al*., 2024). This pervasive disempowerment is deeply rooted in socio-cultural norms that often undervalue women's economic contributions, perceiving them primarily as homemakers responsible for domestic tasks. Gender inequality systematically disempowers the primary labour force, directly constraining their productivity and limiting national agricultural output and food security. This situation emphasize that gender mainstreaming is not merely a social justice issue but an economic imperative for national development.

Apart from disempowerment influenced by cultural norms, climate challenges affect women, men, and youth, acting as a threat multiplier that worsens existing gender inequalities. As traditional food sources become unpredictable and scarcer due to climate impacts, women face losses of income and harvests, which often represent their only sources of food and livelihoods (Dahiru & Ayiwulu, 2025). Rising food prices make essential food items less accessible, particularly for women, whose health has been observed to decline more than men's during periods of food shortages (Fajobi *et al*., 2024). Additionally, as water sources dwindle, women who traditionally bear the heavy burden of water collection are forced to walk even greater distances to find water. This added time commitment reduces their opportunities for income generation or participation in education, further entrenching their disempowerment and weakening

household resilience (Allen *et al.*, 2020). The effects of climate change are not gender-neutral; they intensify the burden on women, limiting their capacity to adapt and perpetuating a vicious cycle of poverty and food insecurity. Crucially, cultural norms, institutional frameworks, and livelihood patterns vary considerably between Southwest and Northcentral Nigeria. These regional differences influence the extent to which women can participate in maize production and climate adaptation efforts.

METHODOLOGY

This study exclusively utilises data and statistics available through the CGIAR Adaptation Atlas (https://adaptationatlas.cgiar.org/). The Atlas is a robust, data-rich platform designed to inform climate adaptation investments and policies in Africa, offering interactive data explorations that provide insights into participation dynamics, climate risks, impacts, vulnerability, and adaptation strategies.

The CGIAR Adaptation Atlas provides several specific data explorations relevant to the objectives of this study:

a. Analyse women's participation and exposure to climate hazards: This tool enables the exploration of the intersection of agriculture, climate change, and gender. It allows for the identification of crops like maize and tasks in which women are most involved, the proportion of women engaged in various regions, and the needs for gender-inclusive investments.
b. Discover Solutions: This tool supports informed decision-making regarding viable adaptation practices. It offers insights into adaptation practices, allows for comparison of practices used on specific crops, impact on crop yield, and the variability of practice impacts across different agroecological zones.

Data Analysis

a. **Geographic focus:** Data was extracted and analysed specifically for Nigeria. Where available within the Atlas, data were disaggregated for the Southwest (Oyo State) and Northcentral (Benue State) regions, as the Atlas allows visualization to country sub-regions.
b. **Crop specificity:** The Atlas's tools allow for analysis focused on specific crops. Data directly relevant to maize production were prioritized.
c. **Disaggregated data:** Quantitative data were extracted to present information disaggregated by gender, focusing on women's participation in maize production, and their adoption of climate-smart practices.
d. **Mapping:** Interactive maps and figures available within the ATLAS were utilised to visually represent regional differences in climate hazards, women's participation in maize production, and adaptive capacity.

Context overview: Nigeria – Oyo and Benue states

Nigeria has a population of 214Million, with 159Million (74.2%) living in rural areas. An estimated 74.3% of Nigeria's population currently lives under USD 3.65/day, whereas 25.7% of the population is considered to be outside of poverty. Agriculture is the second most important sector for the economy of Nigeria, substantially contributing to employment in rural areas. The most prevalent land use in Nigeria is for agriculture, covering 68.6M km² or 75.4% of the total area.

RESULTS AND DISCUSSION

Women's participation in maize production and climate adaptation: A comparative analysis of Oyo and Benue states

Women are involved in various labour-intensive activities throughout the maize food chain, including land preparation, planting, weeding, harvesting, and post-harvest processes. In urban areas, their participation extends to maize-based food processing, street vending, and retail. To assess women's specific roles and their regional distribution, percentages were computed from the ATLAS. The ATLAS provided synthesized findings from national surveys (e.g., LSMS-ISA) and climate vulnerability assessment reports. We extracted qualitative and quantitative insights on gender roles and adaptation practices. For example, a key finding is that women's participation is high in processing and marketing but lower in land preparation, which is often male dominated. The percentages in Table 1 are informed estimates based on the aggregated data trends reported by the ATLAS for the Nigerian context.

While women's overall contribution to agriculture is nationally significant, the specific nature and intensity of their roles in maize production vary regionally, with 31% and 8.5% women in agriculture in Benue and Oyo States, respectively. This variation can be influenced by differing socio-cultural contexts, traditional practices, climate change, challenges, and agricultural systems prevalent in Southwest and Northcentral Nigeria. For example, the extent to which women are involved in land preparation versus post-harvest processing differs considerably between the states. This suggests that interventions aimed at supporting women in maize production must be tailored to these regional/state particularities rather than adopting a one-size-fits-all approach. Understanding these nuances is vital for

designing effective, locally relevant climate adaptation strategies informed by the labour contribution estimates (Table 1), heat stress level that is high in Benue (62) and moderate in Oyo (52), the peculiar challenges experienced and the needs of women farmers.

Table 1: Women's participation in maize production activities in Oyo and Benue states

Maize production activity	Oyo State, Southwest Nigeria- %	Benue State, Northcentral Nigeria - %
Land Preparation	30	15
Planting	75	60
Weeding	80	85
Harvesting	70	75
Post-Harvest Processing	85	90
Marketing/Sales	65	50

2. Climate Adaptation Strategies Practiced by Women Maize Farmers

Farmers in Nigeria are actively implementing Climate-Smart Agriculture (CSA) practices, including indigenous knowledge such as adjusting planting dates and utilising natural pest control methods (Ayi & Undiandeye, 2022). Beyond traditional practices, a range of CSA techniques are available, including crop rotation, minimum tillage, efficient irrigation, water harvesting, the use of improved varieties (e.g., drought-tolerant maize), and integrated soil fertility management (Phiri *et al*., 2022; Mugwe & Otieno, 2021). The "Discover Solutions" data exploration within the CGIAR Adaptation Atlas was used to identify viable adaptation practices for maize, their average impact on crop yield, and the factors influencing their adoption.

While there is a steady increase in publications related to CSA, awareness of these practices generally remains low among farmers. Regional variations in awareness and adoption are also evident, with the Southwest region being the most studied area for CSA implementation. This suggests that the adoption of CSA practices is not uniform across Nigeria, likely influenced by regional socio-economic conditions, access to information, and the specific climate hazards experienced. For instance, the prevalence of drought-tolerant maize varieties or water management or irrigation techniques differ between the more humid Southwest and the semi-arid Northcentral regions. While indigenous knowledge represents a foundational adaptive capacity, there remains a gap in the widespread adoption of more advanced, yield-enhancing CSA techniques, particularly among women farmers. This disparity highlights a critical need for targeted interventions that bridge the knowledge and resource gap.

Table 2: Climate Adaptation Strategies Adopted by Women Maize Farmers and Adoption Determinants in Oyo and Benue States, Nigeria

Climate adaptation strategy	Adoption rate by women in Oyo State - %	Adoption rate by women in Benue state - %	Specific determinants & barriers
Improved varieties	40	25	Oyo: Better access to extension services and agro-dealers. Benue: Limited access to certified seeds and information.
Water management	20	45	Benue: Higher drought stress makes this a priority. Oyo: Higher rainfall reduces immediate pressure.
Crop rotation/ diversification	65	60	Widely adopted, low-cost strategy in both states
Soil fertility management	35	20	Oyo: Slightly better access to fertilizers Benue: Stronger constraints due to land tenure insecurity
Adjusting planting dates	75	70	Widely adopted, relying on experience and climate information

Adaptation is no longer optional; it is necessary for all Sub-Saharan African countries. Nigeria's adaptation analysis shows that two options would generate yield improvements for historical and future periods. These improvements vary between 0.32 (ton/ha) to 0.46 (ton/ha) compared to no adaptation. Adaptation options with the greatest benefits include late maturity improved varieties

with irrigation, current cultivar with irrigation, which together can generate yield gains of up to 0.46 ton/ha compared to a no adaptation situation.

CONCLUSION AND RECOMMENDATIONS

Regional disparities are evident: Benue has higher female participation in agriculture 31.4% versus 8.5% in Oyo) but lower empowerment indices (0.51 vs. 0.72), education, and decision-making access. Oyo has urbanized economy that supports greater empowerment but less engagement in agricultural activities. Climate-Smart Agriculture (CSA) practices, such as drought-tolerant maize and organic fertilizers, can improve yields by 1.26-1.29 Mg/ha, but low awareness and resource constraints limit adoption, especially among women. Empowering women reduces severe food insecurity by 4%, critical amidst Nigeria's projected 33.1 million food-insecure people by mid-2025. The study suggests the need for gender-responsive, region-specific policies, targeted actions and interventions to enhance women's resilience and agricultural productivity.

Policies aimed at fostering climate resilience and adaptation strategies among women in maize production in Nigeria must adopt an integrated, intersectional approach, recognizing that women's vulnerabilities are multifaceted and interconnected.

REFERENCES

Agritech for Women Farmers: A Business Case for Inclusive Growth (2024). *World Economic Forum* https://reports.weforum.org/docs/WEF_Agritech_for_Women_Farmers_2024.pdf

Allen, M., Ashfaquzzaman, M., Bryan, M., Estlund, G., Khanjani, M., Kuiper, M., Raver, K., Shaw, N., & Williams, O. (2020). Women and water in the developing world: Linking water insecurity and gender disparities.*CSIS Journalism Bootcamp*. https://journalism.csis.org/women-and-water-in-the-developing-world-linking-water-insecurity-and-gender-disparities/

Ayi, N. A., & Undiandeye, U. C. (2022). Indigenous Knowledge Systems (IKS) and Adaptation of Climate Smart Agriculture (CSA) in Nigeria. *International Journal of Agriculture and Earth Science (IJAES)*, 8(5), 62–74. https://www.iiardjournals.org/get/IJAES/VOL.%208%20NO.%201%202022/Indigenous%20Knowledge%20Systems.pdf

CGIAR. Adaptation atlas. Retrieved July 28, 2025, from https://adaptationatlas.cgiar.org/

Dahiru, M. K., & Ayiwulu, E. (2025). Implications of Climate Change and Food Crisis on Women Farmers in Contemporary Nigeria. *African Journal of Environment and Natural Science Research*, 8(1), 75-84. https://abjournals.org/ajensr/papers/volume-8/issue-1/implications-of-climate-change-and-food-crisis-on-women-farmers-in-contemporary-nigeria/

Mugwe, J., & Otieno, E. O. (2021). Integrated soil fertility management approaches for climate change adaptation, mitigation, and enhanced crop productivity. *In W. Leal Filho, J. Luetz, & D. Ayal (Eds.), Handbook of climate change management. Springer*. https://doi.org/10.1007/978-3-030-22759-3_325-1.

Obayelu, O., Jimmy, M., & Ojo, A. O. (2024). Women's Empowerment in Agriculture and Household Food Insecurity in Nigeria. Malaysian Journal of Agricultural Economics, 31(1). https://doi.org/10.36877/mjae.a0000541

Passos de Souza, M., Peeters, E., Temmerman, M., Ekström, A. M., Arunda, M. O., Lohan, M., & Delacroix, C. (2025). Protecting sexual and reproductive health and rights amid climate change in Eastern Europe and Central Asia. *UNFPA & ANSER*. https://eeca.unfpa.org/sites/default/files/pub-pdf/2025-05/2025-05_14_ANSER%20Climate%20change_V5.pdf

Phiri A. T., Charimbu, M., Edewor, S. E., & Gaveta, E. (2022). Sustainable Scaling of Climate-Smart Agricultural Technologies and Practices in Sub-Saharan Africa: The Case of Kenya, Malawi, and Nigeria. *Sustainability*, 14(22), Article 14709. https://www.mdpi.com/2071-1050/14/22/14709

COMPARATIVE ANALYSIS OF CLIMATE CHANGE ADAPTATION STRATEGIES ADOPTED BY MAIZE FARMERS ACROSS SELECTED AGROECOLOGICAL ZONES IN NIGERIA

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ABSTRACT

This study compared climate change adaptation strategies adopted by maize farmers across three key agroecological zones (AEZs) [Sudan Savannah (semi-arid), Guinea Savannah (sub-humid), and Rainforest (humid)] in Nigeria. Secondary data from the Africa Agriculture Adaptation (AAA) Atlas that is climate-data rich were used. Descriptive statistics and inferential analysis were used to analyse the extracted data. The results showed that 80% of the adopted adaptation strategies were indigenous, highlighting the significance of traditional knowledge and practices in adaptation to climate change among farmers in Nigeria. The effect of adaptation strategies on maize yield varied across zones, with agroforestry fallow (1.95mg/ha) having the highest in the semi-arid zone, organic fertilizers (1.76mg/ha) in the sub-humid zone, and improved varieties (1.54mg/ha) in the humid zone. Correlation analysis revealed a moderate relationship in yield response across zones, with a positive and significant relationship between the semi-arid and humid zones ($r = 0.448$, $p < 0.10$). The study recommends that adaptation strategies must be tailored to specific agroecological zone.

Keywords: Agro-ecological zones, Adaptation strategies, Climate change, Maize

INTRODUCTION

Climate change poses one of the most significant challenges to agricultural production and food security in Sub-Saharan Africa (Omotayo and Omotoso et al., 2025). Nigeria, as the most populous country in Africa, faces these threats acutely, given its dependence on agriculture for livelihoods and food supply. Among major crops, maize (*Zea mays L.*) holds a strategic role as a staple food and an essential input for livestock feed and agro-industrial uses (Erenstein et al. 2022). Consequently, the ability of maize farmers to adapt to changing climatic conditions is crucial to ensuring food security, rural income stability, and national economic resilience. The impacts of climate variability on maize yield and production differ across Nigeria's distinct agroecological zones ranging from the humid forest in the south to the dry savanna in the north. These zones experience varying climatic stresses, soil characteristics, and resource endowments, which influence farmers' exposure, sensitivity, and adaptive capacity. Accordingly, farmers employ diverse adaptation strategies to address the challenges pose by climate change. However, the nature and effectiveness of adoption vary significantly across regions due to differences in agroecological conditions, access to information, socioeconomic status and institutional support.

Several studies have examined climate change adaptation in Nigerian agriculture across various agroecological zones such as Adepoju and Osunbor (2018), Owombo et al. (2014), Chah et al. 2013, Oyekale and Oladele (2012), and Agbonlahor et al. (2003) in the rainforest zone; as well as Abraham and Fonta (2018) and Falola and Achem (2017) and Usman (2016) in the savannah zone. However, existing literature has not provided a comparative assessment of adaptation strategies across these zones. This study, therefore, aims to conduct a comparative analysis of the climate change adaptation strategies adopted by maize farmers in different agroecological zones of Nigeria. Specifically, it seeks: i. to identify the indigenous and modern climate change adaptation strategies adopted by maize farmers in selected agroecological zones; ii. to assess the effect of adaptation strategies on maize yield across the selected agroecological zones.

METHODOLOGY

The study covered three major agroecological zones (AEZs) in Nigeria based on FAO classifications: semi-arid (Sudan Savannah); sub-humid (Guinea Savannah); and humid (Rainforest zone) (FAO, 2012; FAO,1996). Nigeria's climate ranges from the humid coastal south to the arid north, influencing agricultural practices across regions (Adejuwon, 2006). Rainfall distribution follows bimodal patterns in the south and unimodal in the north, shaping adaptation needs and strategies. Secondary data were obtained from the Africa Agriculture Adaptation (AAA) Atlas and complementary literature. The dataset included information on maize yield, adaptation strategies, and factors influencing adoption across AEZs. Secondary data were obtained from the Africa Agriculture Adaptation (AAA) Atlas and

complementary literature. The dataset included information on maize yield, adaptation strategies, and factors influencing adoption across AEZs. Data were analyzed using descriptive statistics (percentages, charts) and inferential analysis (correlation).

RESULTS AND DISCUSSION

Adaptation strategies adopted by maize farmers across the selected AEZs

The result in Table 1 indicated that fifteen strategies were used by maize famers, out of which 80% were indigenous strategies and were widely used across all AEZs, with slight variations. Agroforestry fallow is adopted in the semi-arid and humid zones, while improved fallow appears only in the humid zone. Conversely, pH control, a modern intervention, is adopted in the semi-arid and sub-humid zones but is absent in the humid zone. This reliance on indigenous practices highlights the relevance of traditional knowledge in climate adaptation decision-making. (Theobald, 2020). On the other hand, modern strategies relatively have limited adoption.

Table 1: Distribution of adaptation strategies adopted by maize farmers across the selected Agroecological Zones

Adaptation Strategies	Semi-Arid (Sudan Savannah)	Sub-Humid (Guinea Savannah)	Humid (Rainforest)
Indigenous Strategies			
Organic Fertilizer	✓	✓	✓
Mulch (Trees)	✓	✓	✓
Mulch (Herbs)	✓	✓	✓
Crop Rotation	✓	✓	✓
Water Harvesting	✓	✓	✓
Crop Residue Incorporation	✓	✓	✓
Green Manure	✓	✓	✓
Alleycropping	✓	✓	✓
Reduced Tillage	✓	✓	✓
Intercropping	✓	✓	✓
Agroforestry Fallow	✓	X	✓
Improved Fallow	X	X	✓
Modern Strategies			
Inorganic Fertilizer	✓	✓	✓
Improved Varieties	✓	✓	✓
pH Control	✓	✓	X

Source: Adapted from Africa Agriculture Adaptation Atlas. Note: ✓ indicates adoption of the adaptation strategy in AEZ while X indicates absence of adaptation strategy.

Effect of each adaptation strategy on maize yield

The effect of each adaptation strategy on maize yield varied considerably across the agroecological zones (Fig. 2). In the semi-arid (Sudan savannah) zone, agroforestry fallow had the most impact, highlighting the benefits of improved soil moisture retention. Organic strategies such as mulching and crop residue incorporation were also beneficial in this dry zone. In sub-humid (Guinea savannah) areas, where rainfall is more reliable, but soil degradation is a concern, organic fertilizers significantly boosted yields. This supports the finding of Vanlauwe et al., (2002). The humid zone (rainforest), with its high rainfall and disease prevalence, benefited most from the use of improved maize varieties.

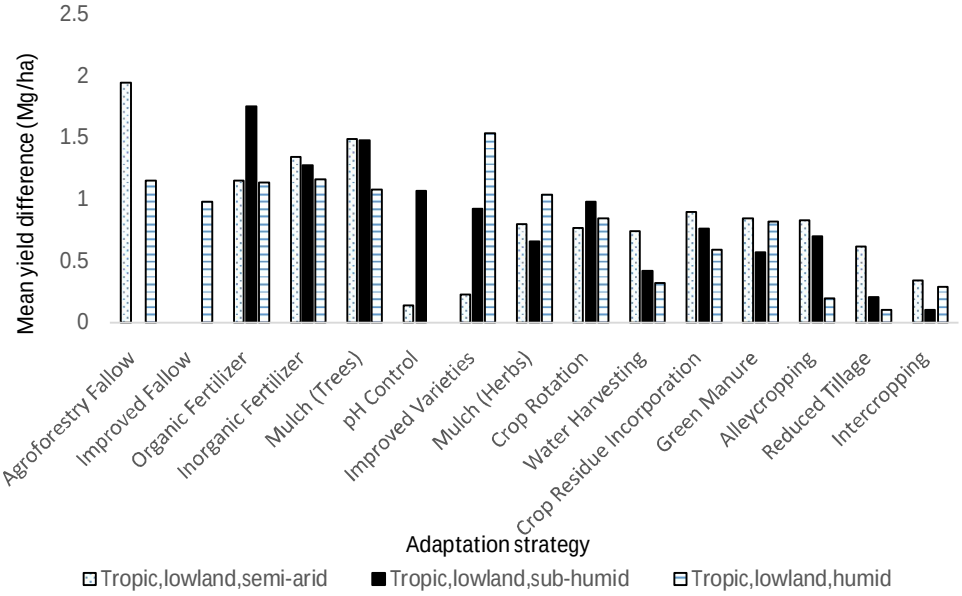

Figure 2: Bar chart showing effect of adaptation strategies on maize yield across the selected agroecological zones in Nigeria

Relationship in how adaptation strategies affect yield across the agroecological zones

The correlation values are all positive, indicating some similarity in the effect of adaptation strategies on yield across the zones. The highest correlation is between Semi-Arid and Humid ($r \approx 0.45$, $p<0.10$) (Table 2).

Table 2: Correlation analysis result showing the relationship among the selected AEZs

AEZs	Semi-arid	Sub-humid	Humid
Semi-arid	1	0.341	0.448*
Sub-humid		1	0.395
Humid			1

*Significant at $p<0.10$

CONCLUSION

The study compares climate change adaptation strategies adopted by maize farmers across three selected AEZs in Nigeria: Semi-arid (Sudan Savannah), Sub-humid (Guinea Savannah) and Humid (Rainforest) zones, using secondary data from the AAA Atlas. The indigenous strategies remain dominant due to their accessibility but modern methods offer significant yield benefits where adopted. Therefore, a zone-specific approach is necessary for enhancing maize productivity and resilience to climate change in Nigeria.

REFERENCES

Abraham, T.W. & Fonta, W.M. (2018). Climate change and financing adaptation by farmers in northern Nigeria. *Financial Innovation*, 4: 11.

Abraham, T.W. & Fonta, W.M. (2018). Climate change and financing adaptation by farmers in northern Nigeria. *Financial Innovation*, 4: 11.

Adejuwon, S.A. (2006). Food crop production in Nigeria: Potential effects of climate change. *Climatic Research*, 32(3), 229–245.

Adepoju, A.O. & Osunbor, P.P. (2018). Small scale poultry farmers' choice of adaption strategies to climate change in Ogun State, Nigeria. *Rural Sustainability Research*, 40: 32–40.

Agbonlahor, M.U., Aromolaran, A.B. & Aiboni, V.I. (2003). Sustainable soil management practices in small farms of southern Nigeria: A poultry-food crop integrated farming approach. *Journal of Sustainable Agriculture*, 22: 51–62.

Chah, J.M., Odo, E., & Asadu, A.N. (2013). Poultry farmers' adaptation to climate change in Enugu North Agricultural Zone of Enugu State, Nigeria. *Journal of Agricultural Extension*, 17: 100–114.

Erenstein, O., Jaleta, M, Sonder, K., Mottaleb, K., Prasanna, B.M. (2022). Global maize production, consumption and trade: trends

and R&D implications. *Food Security*, 14:1295–1319.

Falola, A. & Achem, B.A. (2017). Perceptions on climate change and adaptation strategies among sweet potato farming households in Kwara State, Northcentral Nigeria. *Ceylon Journal of Scence*, 46: 55–63.

Food and Agriculture Organisation (FAO). (1996). Soil Resources, Management and Conservation Service. FAO Soils Bulletin 73. FAO Land and Water Development Division. https://www.fao.org/4/w2962e/w2962e00.htm#P-2

Food and Agriculture Organisation (FAO) (2012). Agro-Ecological Zoning in Africa: A Review.

Food and Agriculture Organization of the United Nations. https://www.fao.org/4/w2962e/w2962e-03.htm#TopOfPage

Omotayo, A.O. and Omotoso, A.B. (2025). Climate-smart agricultural technology and gender-differentiated food, and water security: Evidence from smallholder sunflower (*Helianthus annuus L.*) farmers. *Agricultural Water Management*, 308.

Owombo, P.T., Koledoye, G.F. & Ogunjimi, S.I. (2014). Farmers' adaptation to climate change in Ondo State, Nigeria: A gender analysis. *Journal Geography and Regional Planning*, 7: 30–35.

Oyekale, A.S. & Oladele, O.I. (2012). Determinants of climate change adaptation among cocoa farmers in Southwest Nigeria. *ARPN Journal of Science and Technology*, 2: 154–168.

Theobald, F.T. (2020). Understanding the relevance of indigenous knowledge on climate change adaptation among mixed farmers in the Ngono River Basin, Tanzania. *African Journal of Science, Technology, Innovation and Development*. https://doi.org/10.1080/20421338.2020.1816615

Usman, M.N., Ibrahim, F.D. & Tanko, L. (2016). Perception and adaptation of crop farmers to climate change to in Niger State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, 12: 186–193.

Vanlauwe, B., Palm, C., Murwira, H. & Merckx, R. (2002). Organic resource management in sub-Saharan Africa: validation of a residue quality-driven decision support system. *Agronomie*, 22 (7-8), pp.839-846. 10.1051/agro:2002062. hal-00885980.

WOMEN'S EXPOSURE TO CLIMATE HAZARDS ALONG DIFFERENT AGRICULTURAL VALUE CHAINS IN NIGERIA

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ABSTRACT
Climate change presents severe challenges for women in Nigeria's agricultural sector, where socio-economic inequalities heighten vulnerability to environmental hazards. This study conducted a spatial analysis of women's exposure to climate hazards across Nigeria's six geopolitical zones, emphasizing disparities in education, empowerment, and adaptive capacity. Data from 37 states were analysed using descriptive statistics, ANOVA, and Pearson correlation. Findings reveal strong geographic inequalities. The North Central zone has the highest number of women in agriculture (413,274), while the North West has the lowest (95,510). The South South faces the greatest climate exposure to human heat stress (hs_value = 35.2, $p < 0.001$), while the North West records the lowest women's empowerment (0.27) and education (0.12). A positive correlation ($r = 0.65$, $p = 0.002$) exists between hazard exposure and education, indicating that better-educated regions experience greater climate risk but also higher resilience potential. Domestic violence was highest in the South West (mean = 0.80), reflecting sociocultural influences on vulnerability. The study concludes that climate vulnerability is region-specific and gendered, requiring zone-targeted adaptation strategies. It recommends resilience investments in the South-South and empowerment initiatives in the Northwest to close the gender and environmental inequality gaps.
Keywords: Adaptive capacity, climate hazards, geopolitical zones, gender-based vulnerabilities.

INTRODUCTION

Agriculture remains the mainstay of Nigeria's economy, engaging over 70% of the rural workforce, with women forming a major share in production, processing, and marketing (FAO, 2011; IFAD, 2022). Despite their critical roles, women's adaptive capacity is weakened by limited access to land, credit, extension services, and climate information (World Bank, 2021). Nigeria's agricultural zones face intensifying climate hazards—drought, floods, irregular rainfall, and heat stress—reducing productivity and threatening food security. Women's vulnerability is deepened by social norms, land tenure inequalities, and low institutional support (AAA, 2023). For instance, the 2022 floods affected over 1.4 million people and destroyed over 110,000 hectares of farmland across Benue, Kogi, and Anambra (UN OCHA, 2022; NEMA, 2023). Projected temperature increases of 1.5–2°C by 2050 could reduce yields by 25%, especially in northern states where women dominate cereal production (Atlas Climate Analytics, 2024). Despite these risks, women-led innovations like solar irrigation and drought-resistant seeds showcase increasing adaptive agency (Africa Adaptation Acceleration Program, 2023). However, existing studies rarely disaggregate gender and spatial data. Most treat women as a homogeneous group, ignoring regional variations in exposure, empowerment, and adaptive capacity (CGIAR, 2023). This study bridges that gap through a national, gender-disaggregated spatial assessment.

METHODOLOGY

The study covered all 36 Nigerian states and the FCT, grouped into six geopolitical zones: North West, North East, North Central, South West, South South, and South East. This zoning reflects regional governance and sociocultural contexts affecting women's vulnerability. A quantitative design was adopted using data from the CGIAR Adaptation Atlas (2023) and WorldPop (2016), complemented with empowerment datasets from Rettig (2022). Analyses were performed using SPSS v20, applying descriptive statistics, ANOVA, and Pearson correlation.

Data and variables

Climate Hazard: Measured by heat stress (Hs_value).

Socioeconomic Indicators: Education, employment, empowerment, and domestic violence indices (normalized between 0 and 1).

Agricultural Involvement: Number of women in active agricultural labor per zone.

Analytical approach

Descriptive Statistics summarized zone-level variables.

Correlation and Regression tested relationships between hazard exposure and gender indices.

ANOVA compared empowerment means across zones ($p < 0.05$).

RESULTS AND DISCUSSION

Regional variations in women's agricultural involvement

The North Central zone recorded the highest female participation (413,274 ± 118,210), followed

by the South South (377,588 ± 124,920) and South East (316,876 ± 98,760). The North West had the lowest (95,510 ± 42,150). This disparity reflects population distribution and cultural restrictions on women's public work in the North (Nasir, 2023).

Climate hazard exposure

The South South zone experiences the highest climate hazard (Hs_value = 35.2 ± 1.3) due to coastal humidity, while the North West faces the lowest (32.9 ± 1.2). These spatial contrasts indicate that coastal women are more exposed to heat stress and flooding, aligning with UN OCHA (2022) findings on Nigeria's flood-prone regions.

Socioeconomic vulnerability and correlation analysis

Education strongly correlates with hazard exposure ($r = 0.65$, $p = 0.002$), suggesting that more developed southern regions have higher risk awareness but still face livelihood threats. Employment correlation was weakly negative ($r = -0.12$), showing that climatic shocks reduce women's job security. Empowerment levels were highest in the South West (0.75) and lowest in the North West (0.27) (ANOVA, $p < 0.001$). The South East/South West recorded empowerment levels nearly three times higher than the North West, reflecting persistent gender inequality.

Gender and cultural dimensions

Paradoxically, domestic violence was most prevalent in the South West (mean = 0.80)—despite higher education and empowerment—implying that socio-cultural norms still perpetuate gender-based vulnerability. The North West's low reported rates (0.40) likely reflect underreporting due to cultural silence rather than lower incidence.

These findings underscore that gender vulnerability is multidimensional shaped not only by economic access but also by entrenched cultural systems. Women in climate-affected zones face overlapping stressors: environmental hazards, economic exclusion, and social inequities (FAO, 2011; World Bank, 2021).

Policy implications

The study confirms that hazards are not gender neutral. Climate shocks disproportionately harm women through reduced land control, resource access, and decision-making power. Existing frameworks—such as the National Adaptation Plan (NAP) and National Gender Policy on Climate Change (2020)—recognize these challenges but lack effective implementation.

Empirical evidence from this research supports a zone-specific adaptation model:

- **South South:** Prioritize hazard-resilient farming, flood control, and early warning systems.
- **North West:** Focus on women's education, empowerment, and land tenure reform.
- **South West:** Address domestic violence and integrate gender-sensitive disaster risk reduction.

Table 1: Percentages of women involved in Labour Participation and Crop Participation

Crop Participation	Labour Participation
Non-edible Crops (46%)	Harvesting (42%)
Fruits and Vegetables (38%)	Planting/Weeding (41%)
Root and Tubers (52%)	Land Preparation (41%)
Legumes (40%)	
Cereals (36%)	

Table 2: Hazard Gender Intersection (Mean ± SD)

State_zones	Hs_value	Women_in_ Agriculture	Education	Employment	Empowerment index	Domestic violence
North West	32.9 ± 1.2	95,510 ± 42,150	0.12 ± 0.08	0.58 ± 0.10	0.27 0.05	0.40 ± 0.16
North East	33.1 ± 1.5	265,806 ± 72,430	0.21 ± 0.12	0.38 ± 0.09	0.32 ± 0.07	0.51± 0.14
North Central	33.5 ± 0.9	413,274 ± 118,210	0.49 ± 0.15	0.59 ± 0.12	0.54 ± 0.11	0.61 ±0.12
South West	34.6 ± 1.8	165,330 ± 132,450	0.74 ± 0.10	0.73 ± 0.08	0.75 ± 0.06	0.80 ± 0.07
South South	35.2 ± 1.3	377,588 ± 124,920	0.66 ± 0.14	0.58 ± 0.11	0.65 ± 0.09	0.68 ± 0.09
South East	33.6 ± 0.7	316,876 ± 98,760	0.72 ± 0.07	0.57 ± 0.05	0.74 ± 0.04	0.75±

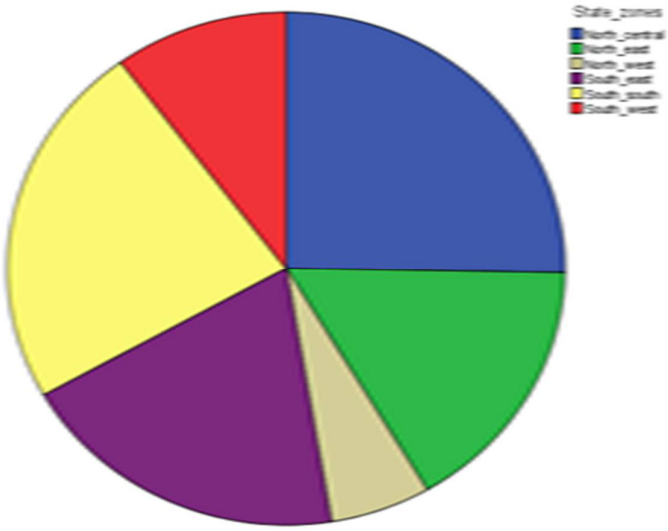

Figure 1: Proportion of Women involved in Agriculture across Nigeria

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that climate risk and gender inequality intersect spatially across Nigeria's agricultural value chains. Regions with higher empowerment often face greater environmental hazards, while northern zones with lower hazard exposure remain structurally marginalized.

To enhance resilience and equity:

1. Integrate gender-responsive adaptation into national and local agricultural policies.
2. Expand women's access to climate-smart technologies, credit, and land rights.
3. Strengthen education and vocational programs to diversify women's livelihoods beyond farming.
4. Implement localized early warning systems and gender-sensitive extension services.
5. Address sociocultural barriers, including domestic violence, through education and advocacy.

Empowering women is not just a gender goal, it is a climate resilience strategy essential for achieving Nigeria's sustainability and food security objectives.

REFERENCES

Africa Adaptation Initiative. (2022). *Africa State of Adaptation Report 2022*. https://africaadaptationinitiative.org

Africa Adaptation Acceleration Program (AAAP). (2023). *Progress Report on Gender and Climate Resilience.*

Ajayi, V. O., Olanrewaju, C. C., & Adesina, F. A. (2022). Urban climate privilege: Reconceptualizing vulnerability and resilience in Nigerian cities. *Journal of Environmental Planning and Management*, 65(8), 1456–1475.

Atlas Climate Analytics. (2023). *Climate Impact Projections for Nigeria.* CGIAR. (2023). *Adaptation Atlas: Gender and Climate Risks in Nigeria.* https://adaptationatlas.cgiar.org

FAO. (2011). *The State of Food and Agriculture: Women in Agriculture – Closing the Gender Gap for Development*. FAO.

IFAD. (2022). *Creating Opportunities for Rural Women in Agriculture: Nigeria Country Profile.* https://www.ifad.org

Nasir, A. M. (2023). Patriarchal structures and gendered climate resilience: Barriers to women's adaptation in Northern Nigeria. *Gender and Development*, 31(1), 89–107.

NEMA. (2023). *Annual Flood Impact Assessment Report*. National Emergency Management Agency, Nigeria.

Rettig, E. (2022). *Replication Data for: Female Empowerment in Sub-Saharan Africa*. Harvard Dataverse.

UN OCHA. (2022). *Nigeria Flood Situation Report.* https://reliefweb.int

UN Women. (2021). *Women and Climate Change: Facts and Figures.* https://www.unwomen.org

World Bank. (2021). *Gender and Climate-Smart Agriculture in Sub-Saharan Africa.* World Bank Group.

USE OF INDIGENOUS FARM SAFETY KNOWLEDGE IN PREVENTING HAZARDS AMONG CROP FARMERS IN ONA-ARA LOCAL GOVERNMENT AREA, OYO STATE

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ABSTRACT

Farm safety practices play a vital role in preventing hazards among crop farmers. The study examined the use of indigenous farm safety knowledge in preventing hazards among crop in Ona-Ara Local Government Area, Oyo State. Multi-stage sampling procedure was used to select 110 respondents. Data were collected using structured questionnaire and analysed frequency count and percentages while Chi-Square and Pearson Product Moment Correlation (PPMC) were used to test the hypothesis. The results revealed that most of the respondents were male (98.2%), married (91.8%) with mean age of 46.3 years. Crop farming hazards commonly faced included injuries from farm tools (76.4%), chemical exposure (83.6%) and wild animal attacks (66.4%). Indigenous safety knowledge such as herbal poultices to treat wound (4.00), use of cold mud pack to reduce swelling or pain (4.00), use of charcoal powder to stop bleeding (4.00) and use of herbal concoction to slow spread of venom of snakebite (4.00). Radio (74.6%), peers (91.8%) and community elders (97.3%) were identified as sources of information mostly accessed by the respondents. Inadequate funding (1.890), poor government policy (1.855), seasonality and inadequate materials (1.455) were identified as the most severe constraints to use of indigenous farm safety knowledge. There was a significant relationship between constraints (r=0.332, p=0.000) and use of indigenous farm safety knowledge**.** It is therefore recommended that stakeholders should develop intervention programmes that will deploy strategies in promoting and scaling up the use of indigenous farm safety knowledge among crop farmers.

Keywords: Indigenous knowledge, Farm safety practices, Crop farmers, Hazard

INTRODUCTION

Indigenous knowledge plays a significant role in farm safety, as it encompasses traditional practices and beliefs passed down through generations (Adiogun, 2020). Indigenous practices are establishing and enhancing the sustainability of agriculture, especially among crop farmers, who culturally and ecologically provide services to people in their society (Albizua *et al.,* 2021). Agriculture accounts for approximately 30% of all work-related fatalities worldwide. Smallholder farmers, who produce much of the world's food, are particularly vulnerable to safety risks due to limited access to resources, training, and safety equipment (Mrema *et al.,* 2018). Indigenous knowledge has been recognized as a valuable resource for promoting sustainable agriculture and improving farm safety (UNESCO, 2019). It encompasses traditional practices, beliefs, and innovations developed over centuries, allowing communities to adapt to local environments and manage risks (Warburton, 2018).

Despite the importance of indigenous knowledge in farm safety, its use has been largely overlooked. By investigating the intersection of indigenous knowledge, farm safety, and sustainable agriculture, this research contributes to a nuanced understanding of the complex relationships between traditional knowledge, cultural context, and agricultural development. Empowering farmers with indigenous knowledge-based safety practices improves productivity (IFAD, 2019). This study therefore examined the use of indigenous knowledge of farm safety practices in preventing hazard among arable crop farmers. Specify objectives are to ascertain occurrence of common crop farming hazard, sources of information on indigenous knowledge farm safety practices and identify the constraints faced by respondents to knowledge of farm safety practices.

METHODOLOGY

The study was conducted in Ona-Ara Local Government Area of Oyo state. The area is approximately 20 km southeast of Ibadan, the state capital. The area covers a land area of 290 km². Ona-Ara LGA has a tropical savanna climate with two distinct seasons (wet and dry) and tropical savanna vegetation with scattered forests. As of the 2006 census, the population was 278,245, with a population density of 959 people per km². Agriculture is the major occupation, with crops such as cassava, maize, yam and cocoa being cultivated. A three-stage random sampling method was used to select the respondents for this study. The first stage involved random sampling of 30% of village headquarters in Ona-ara local government area. Secondly, this involved random sampling of 30% of villages prominent in arable crop farming in each village headquarters selected, these are: Lastly, 35% of farmers in each village (Akaran; 25, Badeku:19, Odi-Aperin:27, Ajia:19 and Gbedun:20) were selected using systematic random sampling to give 110 respondents. Data were analysed using both descriptive and inferential statistics such as frequency and percentage while Chi-square and PPMC analysis were used to analyse the hypotheses.

RESULT AND DISCUSSION

Table 1 shows the most (98.2%) of the respondents were male while only 1.8% were female, suggesting limited female involvement in crop production in the area. The result of respondents' age revealed that 50.9% fell within the age range of 41–60 years. This indicates that middle-aged and elderly individuals are more actively involved in farming, while younger people are less represented, possibly due to migration to urban areas (Sharimakin and Dada, 2020). Marital status shows that 91.8% of respondents were married. It reinforces the idea that married individuals might have a greater collective economic capacity or stability, which could influence their participation in certain economic activities. This suggests that farming is a family-supported activity, and income from farming is likely used to support household needs (Igwe and Ijeh, 2019). Also, 53.6% of the respondents were Christians, 32.7% Muslims while 13.6% practiced traditional religion.

Table 1: Socioeconomic characteristics of the respondents

Variables	Frequency	Percentage
Sex		
Male	108	98.2
Female	2	1.8
Age (Years)		
21-40	25	22.7
41-60	56	50.9
Above 60	29	26.4
Marital status		
Single	8	7.3
Married	101	91.8
Widow	1	0.9
Religion		
Christianity	53	53.6
Islamic	36	32.7
Traditional	15	13.6

Table 2 revealed that most (65.5%) of the identified high occurrence of crop farming hazards while 34.5% considered this to be low in the study area. This might be attributed to claim that farmers are routinely exposed to a wide range of health and environmental risks, underscoring the vulnerability inherent in agricultural occupations, particularly under traditional and small-scale settings. This finding echo earlier reports of Ngowi *et al.* (2017), who identified farming as one of the most hazardous occupations globally due to frequent use of sharp tools and unsafe equipment.

Table 2: Occurrence of crop farming hazard

Category	Frequency	Percentage	Mean
High	72	65.5	58.51
Low	38	34.5	
Total	110		

Table 3 revealed that most (55.5%) of the respondents had high access to sources of information on indigenous farm safety knowledge while 44.5% had low access.

Table 3: Access to sources of information on indigenous farm safety knowledge

Category	Frequency	Percentage	Mean
High	61	55.5	24.28
Low	39	44.5	
Total	110	100	

Table 4 presenting the use of indigenous farm safety knowledge revealed that 52.7 % considered the use to be high while 47.3% had low of use. This means that level of use of indigenous farm, safety knowledge was slightly high among the respondents, however, close to half of the respondents also had low use. This is an indication that some indigenous knowledge is very common while others are not general knowledge among the respondents, where the common ones gained high recognition and practices while some are not. This indicates strong confidence in plant-based treatments among farmers. This result is supported by Agwu and Irohibe (2021) who found that farmers

often fall back on indigenous knowledge to manage risks due to limited access to modern agricultural support systems.

Table 4: Use of Indigenous farm safety knowledge

Category	Frequency	Percentage	Mean
High	58	52.7	54.81
Low	52	47.3	
Total	110	100	

The result on constraints as presented in Table 5 revealed that most (57.3%) of the respondents identified their constraints to use of indigenous farm safety knowledge to be high while 42.7% considered it as less severe. This is an indication that the constraints faced influence the level of use among the respondents. Ajayi *et al.*, (2021) noted, many indigenous inputs are becoming harder to find due to deforestation and climate variability.

Table 5: Constraints to use of indigenous knowledge of farm safety practices

Category	Frequency	Percentage	Mean
High	63	57.3	16.45
Low	37	42.7	
Total	110	100	

The Chi square analysis shows that sex (χ^2=8.786, p=0.043), marital status (χ^2=21.468, p=0.002) and religion (χ^2=13.533, p=0.0035) have significant relationships with use of indigenous farm safety practices. This suggests that these socio-cultural factors influence how farmers apply farm safety knowledge. This agrees with findings by Oyesola *et al.*, (2021), who reported that gender and religion shape farm behavior more than education. Also, significant relationship existed between the constraints farmers faced and their use of indigenous knowledge in farm safety practices.

Table 6: Chi-square and PPMC analysis

Variables	Chi-square	r- value	p-value	Decision
Sex	8.161		0.043	S
Marital status	21.468		0.002	S
Religion	13.5		0.035	S
Constraints		0.322	0.000	S

CONCLUSION AND RECOMMENDATIONS

This study concluded that majority of respondents were middle-aged males practiced indigenous farm safety knowledge where most of them had good access to sources of information on indigenous knowledge. The study further concluded that the constraints to use of indigenous farm safety knowledge such as seasonal material shortages, poor documentation and lack of formal training hindered the use of indigenous farm safety practices. Factors such as gender, marital status, and religion significantly influence the use of indigenous farm safety knowledge in preventing farm hazard.

Based on the findings of the study, the following recommendations were made: The government should also establish funding mechanisms such as grants, subsidies, or incentives to support the use and promotion of traditional safety practices among farmers.Also, community-based systems should be developed to document and preserve indigenous farm safety knowledge in accessible formats such as booklets, posters, audio recordings, and videos.

REFERENCES

Adiogun, F. A. (2020). Farming system and cultivation constraints in African yam storage practices and storage losses. Journal of Agriculture and Crops Research, April issue.

Agwu, A. E. and Irohibe I. J., (2021). Indigenous knowledge and farmers' adaptation to climate change in rural Nigeria. *Journal of Agricultural Extension, 25(1), 80–90.*

Ajayi, M. T. and Edeoghon, C. O., (2021). Assessment of farm safety awareness among rural farmers in Edo State, Nigeria. *Nigerian Journal of Rural Extension and Development, 15(2), 23–29.*

Albizua, A. (2021). Indigenous knowledge and sustainable agriculture among crop farmers. *Journal of Agricultural Science, 19(1), 1-12.*

IFAD (International Fund for Agricultural Development). (2019). Creating opportunities for rural youth:2019RuralDevelopmentReport. IFAD *https://www.ifad.org/en/w/publications/2019-rural-development-report.*

Igwe, A. A., and Ijeh, N. D (2019). Awareness and Determinants of Sustainable Agricultural Land Management Practices among Crop Farmers in Ebonyi State, Nigeria. *International Journal of Agricultural Research and Food Production* ,4(4), 1-10.

Mrema, E. G., Mbega, E. R., and Leonard, S. S. (2018). Pesticide exposure and health impacts among farm workers in Tanzania: A review of existing literature. *Journal of Environmental Health Science & Engineering, 13_ (1), 1-11*

Ngowi, A. V. F., Mbise, T. J., Ijani, A. S. M., Landrigan, P. J., and London L. (2017). Smallholder farmers' use of integrated pest management practices in Tanzania. *Environmental Health insights, 11, 1-11*.

Oyesola, O. B., and Ademola, A. A. (2021). Influence of socio-cultural factors on farm safety practices among rural farmers in southwestern Nigeria. *Journal of Agricultural Extension, 25(2), 52–60.*

Sharimakin, A., and Dada, J. T. (2020). Access to Finance, Indigenous Technology and Food Security in Nigeria: Case Study of Ondo Central Senatorial District. Economics and Culture, 17(2), 75-87

Warburton, H. (2018). Indigenous knowledge and sustainable agriculture: A review. *Journal of Sustainable Agriculture, 40(1), 1-15.*

CHALLENGES OF HOME-GROWN SCHOOL FEEDING PROGRAMME AMONGST PARTICIPATING AND NON-PARTICIPATING FISH FARMERS IN OSUN STATE: IMPLICATION FOR SUSTAINABLE AGRICULTURE

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ABSTRACT
The study assessed the challenges faced by home-grown school feeding programme amongst participating and non-participating fish farmers in Osun state. A multistage sampling procedure was used to select a total of 211 fish farmers for the study. The data was described using frequencies, percentages, means and analysed with independent sample t - test. More than half (53.4%) of the participating fish farmers completed two production cycles annually in contrast to non-participating fish farmers who completed only one production cycle annually. Also, high cost of fish feed and high cost of fingerling ($\bar{X}$ = 2.00) ranked 1st among the participating fish farmers while, poor access to credit ($\bar{X}$ = 2.00) ranked 1st among the non-participating fish farmers. The result of t-test analysis revealed significant difference ($p \leq 0.001$) in the challenges faced by both groups of farmers. Specifically, participating fish farmers have lower mean score (19.03) indicating a reduction in the farming challenges experienced as compared to non- participating fish farmers (20.44). Based on the result of the findings it was concluded that participating reduced fish farmers' challenges. It was recommended that the programme handlers should subsidize the cost of feed and fingerlings for the participating fish farmers for sustainable fish production under the programme.
Keywords: Home-Grown School Feeding Programme, Fish farming, Challenges, Fish farmers,

INTRODUCTION

Nigeria being an agrarian society has great employment potential for the country's teeming population in fish farming due to friendly and fish farming sustainable environment (Adesoji *et al.*, 2017). FAO (2021) noted that, Nigeria is one of the countries in sub-Saharan Africa endowed with great potential for attaining sustainable fish production through fish farming due to the extensive mangrove ecosystem available in the country. While aquaculture could contribute to HGSFP by providing nutritious fish products that have potential to support the local economy which includes the provision of nutritious fish products (Ahern *et al.*, 2020).

The School Feeding Programmes constitute critical interventions that have been introduced in many developed and developing countries of the world to address the issue of poverty, stimulate school enrolment and enhance performance (Appollm and Braima, 2021). According to Munuhe (2014), the Home-Grown School Feeding Programme provides food produced and purchased within a country to children attending public schools. FAO (2019) noted that the programme emerged as an opportunity to improve the livelihoods of smallholder farmers and the local communities and to also strengthen the nexus between nutrition, agriculture and social protection. In similar vein, Nkang and Ereh, (2021) opined that HGSF programmes enables the development of nutrition-sensitive and inclusive food value chains, which maximize benefits for all the involved stakeholders, and it plays an important role in shaping and strengthening sustainable local and national food systems.

In Nigeria, the National Home-Grown School Feeding Programme is an initiative of the Federal government within the framework of the Universal Basic Education (UBE) Act of 2004 (Imeh and Johnson, 2017). According to Onah, (2021) the pilot programme began in 12 states and in the Federal Capital Territory, but it was not sustainable as if failed within a year. However, despite this failure, out of the original pilot states only Osun state continues to always implement the school feeding programme (Olajubutu *et al.*, 2021).

Though HGSFP has been widely accepted as being a government initiative and a social intervention programme that can sustainably enhance agricultural development in rural areas, there is however notable dearth of empirical evidence about the challenges the programme encounters by participating fish farmers in Osun State. Hence, the study therefore seeks to address this gap by critically examining challenges faced by HGSFP participating and non-participating fish farmers in the study area in Osun State. Specifically,

i. investigated the production characteristics of HGSFP participating fish farmers and non-participating fish farmers.
ii. identified the challenges faced by HGSFP participating fish farmers and non-participating fish farmers in the study area.

METHODOLOGY

The study was carried out in Osun State of Nigeria, which is located in the Southwest of Nigeria A multistage sampling technique was adopted for was employed in selecting the respondents that are participating in the programme. At the initial stage, 40 percent of the state's 30 Local Government Areas (LGAs) were randomly selected resulting to 12

LGAs from which 70 percent of the fish farmers registered under the HGSFP in these LGAs were randomly selected giving rise to 103 participants. Similarly, multistage sampling technique was utilized in selecting non-participating fish farmers. Two prominent fishing zones; Ede and Ikirun were purposively selected due to their extensive fish farming activities in the state. Four villages from each of these selected zones were purposively chosen and subsequently within each of these selected villages, 40 percent of the fish farmers were randomly sampled which culminated into a total of 108 non-participating fish farmers. In total, 211 respondents were selected for the study. Data was obtained with the use of questionnaire and analysed with descriptive statistics such as frequency counts, percentages while the mean scores generated for each of the challenge item was used to rank the challenge in the order of their severity. The stated hypothesis was tested with the use of t-test.

RESULTS AND DISCUSSION

Production characteristics of the respondents.

The results available in Table 1.0 shows that 53.4% of the participating fish farmers carried out two fish cycles within a year, 39.8% carried out 1 fish cycle per year and 6.8% carried out 3 fish cycles per year. The mean fish cycle carried out per year was 2 among the participating fish farmers meanwhile 67.6% of the non-participating fish farmers carried out 1 fish cycle per year, 29.6% carried out 2 fish cycles per year and 2.8% carried out 3 fish cycles per year. The mean fish cycle carried out per year was 1 among the non-participating fish farmers.

Table 1.0 also revealed that that 69.9% of the participating fish farmers made use of earthen pond while 30.1% of the participating fish farmers made use of concrete pond in farming fish. Meanwhile, for the non-participating fish farmers, 82.4% made use of earthen pond for fish farming while 17.6% of the non-participating fish farmers made use of concrete for fish farming. About 77% of the participating fish farmers and 98.1% of the non- participating fish farmers used static renewal for rearing fish. However, only 23.3% of the participating fish farmers and 1.9% of the non-participating fish farmers used the flow through technology.

Moreover, results indicated that all (100%) of the participating fish farmers reared catfish meanwhile 87.0% of the non-participating fish farmers reared catfish while 13.0% reared tilapia fish. These results confirmed that the participating fish farmers were compliant in farming catfish which is the only fish species of fish accepted by the HGSFP for feeding students owing to its high nutrient content.

Table 1: Distribution of Production Characteristics of HGSFP Participating Fish Farmers and Non-participating Fish Farmers in the Study Area

	Participating fish farmers			Non – participating fish farmers		
Socioeconomic variables	**Frequency**	**Percentage**	**Mean**	**Frequency**	**Percentage**	**Mean**
Fish cycles per year						
1	41	39.8		73	67.6	
2	55	53.4	2	32	29.6	1
3	7	6.8		3	2.8	
Type of fishpond						
Earthen pond	72	69.9		89	82.4	
Concrete	31	30.1		19	17.6	
Technology used in rearing fish						
Static renewal	79	76.7		106	98.1	
Flow through	24	23.3		2	1.9	
Type of fish reared						
Catfish	103	100		94	87	
Tilapia				14	13	

Source: Field Survey, 2024

Challenges faced by participating fish farmers and non-participating fish farmers

The challenges affecting both groups of fish farmers are presented in Table 2.0. Using the mean score to rank, it revealed that poor access to credit ranked 1st among the non-participating fish farmers as opposed to the participating fish farmers, where poor access to credit ranked 3rd. This means that despite the involvement of participating fish farmers in HGSFP they still struggle with limited access to credit. Results obtained also indicated that inadequate market access represents another critical issue as it ranked 6th for the non-participating fish farmers ($\bar{X}$ = 1.91) and 12th for the participating farmers ($\bar{X}$ = 0.77). This result is in tandem with the findings of Barnabas *et al.*, (2023) that the programme provides a stable market for small holder farmers which not only helps to improve income but also encourages agricultural productivity.

High cost of feeds dominated as a top challenge for the participating fish farmers on Table 2.0 as it ranked first. However, this same challenge ranked fourth ($\bar{X}$ = 1.97) for the non-participating fish farmers. This implies that high feed costs stand as a critical burden for both groups of farmers as feed cost takes a large chunk of production costs and without affordable feed options, farmers struggle to maintain profitability. Also, high costs of fingerlings is also an identified challenge, ranking first for the participating farmers and third for the non-participating fish farmers. Moreover, high cost of fish processing equipment ranks as the third challenge for the HGSFP participating fish farmers ($\bar{X}$ = 1.93) and as the second for the non-participating fish farmers ($\bar{X}$ = 1.99). Processing equipments are critical and very important for adding value to harvested fish, however its prohibitive cost limits accessibility and usage which contributes to post harvest losses.

The lack of stable electricity is another pressing challenge as it ranked as the fifth challenge for participating fish farmers ($\bar{X}$ = 1.71) and ranked as the ninth challenge for the non-participating fish farmers ($\bar{X}$ = 1.35). The problem with frequent power outages is that it disrupts critical operations such as water aeration and water circulation thus leading to increased fish mortality and reduced productivity. Furthermore, the prevalence of diseases and pests also affects fish farming as it ranked as the seventh challenge for the participating farmers ($\bar{X}$ = 1.51) and ranked as the eighth challenge for the non-participating fish farmers ($\bar{X}$ = 1.46)

Table 2: Distribution of respondents according to challenges faced in fish production

		Participating fish farmers		Non – participating fish farmers	
S/N	**Challenges**	**Mean**	**Rank**	**Mean**	**Rank**
1	Poor security	0.96	10th	1.01	11th
2	Poor access to credit	1.93	3rd	2.00	1st
3	Inadequate market for fish	0.77	12th	1.91	6th
4	Limited knowledge of aquaculture tech.	1.44	8th	1.74	7th
5	High cost of fish feed	2.0	1st	1.97	4th
6	Prevalence of pest and diseases	1.51	7th	1.46	8th
7	Lack of stable electricity	1.71	5th	1.35	9th
8	Poor road access to farm	0.90	11th	0.89	12th
9	Lack of fish processing facilities	1.70	6th	1.94	5th
10	High cost of fingerlings	2.0	1st	1.98	3rd
11	Unavailability of land for Fish processing activities	0.50	13th	0.44	14th
15	High cost of fish processing equipment	1.93	3rd	1.99	2nd
16	Difficulty in maintaining fish farm	1.19	9th	1.07	10th

Source: Field survey, 2024

Test of difference in challenges faced by HGSFP participating fish farmers and non-participating fish farmers.

Results available in Table 3. revealed that participating fish farmers have a lower mean value of 19.03 while the non-participating fish farmers have a higher mean value of 20.44. With a t-value of -4.237 and $p \leq 0.001$, this implies there is a highly significant difference between the challenges faced by the two groups of fish farmers. This result suggests that participation in the HGSFP minimised the challenges that is associated with fish farming.

Table 3: Test of Difference in Challenges by Participating Fish Farmers and Non-participating Fish Farmers.

Group	N	Mean	SD	t–value	df	*p*– value
Participating fish farmers	103	19.03	2.57			
				-4.237	209	<0.001***
Non – participating fish farmers	108	20.44	2.28			

Source: Field survey, 2024, *** Significant at 0.001 level (2- tailed)

CONCLUSION AND RECOMMENDATIONS

This study concluded that participation in the HGSFP is associated with increased production cycles alongside higher adoption of concrete ponds and flow-through systems for fish farming which suggests enhanced production efficiency among participating fish farmers. Also, participating fish farmers faces lesser market problem due to the structured demand and readily available market opportunity they enjoy from the programme as opposed to non-participating fish farmers who are faced with more significant challenges. In order to further maximize the benefits of the programme, it is recommended that, participating fish farmers can

form cooperatives in order to pool resources and share relevant knowledge on aquaculture among themselves to improve management practices and profitability.

REFERENCES

Adesoji, S.O., Adereti, F.O and Ogundeji, A.O. (2017). Assessing the Determinants of the Push and Pull Factors Influencing Participation in Fish Farming in Osun State, Nigeria. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*.17(3)

Ahern, M. B., Thilsted, S.H., Kjellevold, M., Overå, R., Toppe, J., Doura, M., Kalaluka,E., Wismen, B., Vargas, M. and Franz, N. (2021). Locally Procured Fish is Essential in School Feeding Programmes in Sub-Saharan Africa.Foods. *https://doi.org/10.3390/foods10092080 (*Accessed: 12th July 2024)

Alawode, O. O. and Ajagbe, S.O. (2020). Profitability of Small-Scale Catfish Production in Southwest Nigeria: The Challenges. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development,* 20 (3)

Appollm, Y.I. and Daniel, B. (2021). Impact of School Feeding Programme on Crop Production in Gombe, Northeastern Nigeria. *International Journal of Education, Humanities and Social Science*. 4(3):181-192.

Barnabas, B., Amoako, S. and Agyemang, M.B. (2023). Impact of Home-Grown School Feeding Program on Smallholders' Farmer Household Food Security in North-Eastern Nigeria. 12(12):2408-2508.

FAO. (2021). Fish In Home-Grown School Feeding Angola, Honduras And Peru. http://www.fao.org/3/cb3708en/cb3708en.pdf. (Accessed: 7-07-2023)

Imeh, A. I. and Johnson, O.O. (2017). Executing Strategic Initiatives in the Management of Home-Grown School Feeding Programme: Imperative for National Development. *International Journal of Innovation in Educational Management*, 1, 1

Nkang, E.I. and Ereh, C.E. (2021). Home-Grown School Feeding Programme and Primary Education in AkwaIbom State. *International Journal of Educational Benchmark (IJEB),* 18(2).

Olajubutu, D.F., Adebayo, B.O. and Olajubutu, O.J. (2021). Impact of Osun Elementary School Feeding and Health Programme (OMEALS) on the Enrollment and Retention of Rural Primary School Pupils in Osun State, Nigeria. http://www.researchgate.net/publication/356573958 (Date accessed: 17/January/2024)

Onah, R.C. (2021). Implementation of the National Home-Grown School Feeding Programme (NHGSFP) in Nigeria: Examining the Issues, Impediments, and the Way Forward. *Journal of Public Administration and Governance*. 11(3)

CONSUMERS' PREFERENCE AND PERCEPTION TOWARDS ORGANIC LEAFY VEGETABLES IN IBADAN METROPOLIS, OYO STATE.

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ABSTRACT

This study examines the consumer's preference and perceptions towards organic leafy vegetables in Ibadan metropolis of Oyo state. A multistage sampling procedure was used to select the respondents. Data were collected using interview schedule and analyzed using descriptive and inferential statistics. Most (60.0%) of them were female, 65.7% of them had tertiary education while their mean age was found to be 35 years. Organic leafy vegetables that were available in the study area were *Corchorus spp. (ewedu)* (98.3%), *Amaranthus (efo soko)* (95.0%), *Celosia (efo tete)* (94.2%) and Fluted pumpkin *(Ugu)* (85.3%) and the consumers preferred *Celosia (efo tete)* and *Amaranthus (efo soko)* ($\bar{x}$= 1.59. Factors influencing the intake of organic leafy vegetables includes availability of the vegetables (87.5%) and health status (69.2%). The intake of organic leafy vegetable was limited by the relatively high price of the organic vegetable. The study concluded that the respondents had favorable perception towards consumption of organic leafy vegetables and therefore recommends that consumers should consider growing their own organic leafy vegetables identified and the farmers should ensure availability of the vegetables at all times so as to encourage continuous patronage in the study area.

Keywords: Organic farming, Consumer's preference, Leafy vegetables

INTRODUCTION

Organic food production is germane in enhancing food production and livelihoods through resilent, sustainable farming, and innovative agricultural systems. Organic agriculture is a holistic production management system which promotes and enhance agroecosystem health including biodiversity, biological cycle and soil biological activity (FAO, 2001) Organically produced leafy vegetables are vegetables grown with the exclusion of synthetic chemicals through sustainable agricultural practices. All activities involved in the entire production process are observed in accordance with principles guiding the farming practice to ensure care, and fairness to both producers and the consumers in terms sales price, ecological conservation, and uncompromised healthy condition of the consumers, the farmer (producers), and the environment (Adeoluwa, 2010). The link between health and environmental benefits should be strengthened to increase interest among consumers (Magnusson et al, 2003). With rising concern of health issues and food safety, many consumers have turned their site to organic products. The need to strengthen rural food system through innovative approaches that enhance productivity necessitate the consumers preference and perception towards organic leafy vegetables consumption. This study attempted to gain knowledge about consumer perception towards organic food product consumption and to see whether they have preference for some leafy vegetables than others. The general objective of this study was to investigate the consumers' preference and perception of organic leafy vegetables consumption in Ibadan metropolis, Oyo state : identify the socio-economic characteristics of the respondent, identify the different types of organic leafy vegetables available, ascertain the most preferred organic leafy vegetable amongst the respondents, investigate the respondent's perception of organic leafy vegetables, determine the factors influencing consumption of organic leafy vegetables and ascertain the constraint to the consumption of organic leafy vegetables amongst the respondents in the study area.

METHODOLOGY

The study was conducted in Ibadan metropolis area of Oyo state which is geographically located in the South West region of Nigeria. It is located between latitudes 7°02'N and 9°10'N and longitude 2°04'E and 4°30'E. The people in the state are homogenous and are primarily agrarian but have predilection for living in high density urban centres. The population of the study consists of all organic leafy vegetable consumers in Ibadan metropolis. A multistage sampling procedure was used for the study. The first stage involved purposive selection of two major Ibadan Go organic market outlets which include Federal College of Agriculture, Moor plantation Ibadan and University of Ibadan, Oyo State which were the only known market for certified organic vegetables at the time of this study (NOAN 2018). The second stage involved the use of simple random sampling technique to select fifty (50) respondents at the Federal College of Agriculture, Moor plantation Ibadan and seventy (70) respondents were selected due to high population of respondents at the University of Ibadan from the consumer's list obtained from Association of Organic Agriculture Practitioners of Nigeria where they have both organic farmers and consumers which give a total sample size of one hundred and twenty (120) respondents used for the study. Data were described using frequencies, percentages and mean. To ascertain the most

preferred organic leafy vegetables from the list presented and was measured and scored as; Most preferred = 2, preferred = 1, and not preferred = 0. Mean scores were generated and used in ranking the most preferred leafy vegetables. The respondents' perception of organic leafy vegetable consumption was measured on a five points Likert scale of Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree with assigned scores of 5, 4, 3, 2, 1 respectively. Index of perception was derived from the responses to the statements, which was categorised into favourable and unfavourable levels. A list of possible constraints was presented to the consumers to indicate the extent to which they encounter them. Respondents were to indicate the level of perceived severity of each constraint on a three point Likert-type of scale: Major constraints = 2, Minor constraints = 1, Not a constraint = 0. The mean score was generated and used to rank the constraints.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows that most (68.3%) of the respondents were below 40 years, 20.0% of them were within 41-60 years, while 11.7% of them were above 61 years of age with mean age was of 35 years which implied that most of the respondents in the study area were adults who probably make diet decisions themselves. This result confirms the findings of other consumer studies such as Kwakwa (2013) who both concluded that an active adult population requires food to meet their daily carbohydrate and protein needs for sustenance. Also, most (60.0%) of the respondents were female while 40.0% were male. This implies that females in the study area consume organic leafy vegetables than males. This finding is in line with that of Kwakwa (2013), whose sample was also in favour of the females folks. Furthermore, most (65.8%) of the respondents had tertiary education and only 10.0% of them had no formal education. It shows that respondents in the study area were educated folks who actually understand the benefit of consuming organic leafy vegetables World Bank, (2016) revealed that it is expected that educated consumers should be more willing to pay and consume certified vegetables than those who are uneducated.

Table 1 Distribution of the respondents by their socioeconomic characteristics n=120

Variables	Frequency	Percentage	Mean
Age (years)			
40 years and below	82	68.3	35years
41 – 60	24	20.0	
61 years and above	14	11.7	
Sex			
Male	48	40.0	
Female	72	60.0	
Educational status			
No formal education	12	10.0	
Primary education	9	7.5	
Secondary education	20	16.7	
Tertiary education	79	65.8	

Source: Field survey, 2024

Organic leafy vegetable available in the study area

Results in Table 2 show the organic leafy vegetables available in the study area. The result revealed that *Corchorus spp (ewedu)* (98.3%), *Amaranthus (efo tete)* (95.0%), *Celosia (efo soko)* (94.2%), *Bitter leaf (ewuro)* (86.7%) and *Fluted pumpkin (Ugu)* (85.3%) were the organic leafy vegetable that are available in the study area. Furthermore, *Gernodana Mushroom* (41.7%) and *Oyster Mushroom* (36.7%) were least available in the study area.

Table 2: Organic leafy vegetables available in the study area

Organic Leafy Vegetables	Frequency	Percent
Fluted pumpkin (Ugu)	103	85.8
Amaranthus (efo Tete)	114	95.0
Celosia (efo Soko)	113	94.2
Corchorus spp (ewedu)	118	98.3
Oyster Mushroom	44	36.7
Gernodana Mushroom	50	41.7
Bitter leaf (ewuro)	104	86.7

Source: Field survey, 2024

Van Jaarsveld et al. (2014) reported *Amaranthus spp., Corchorus spp (ewedu)* and *Celosia (efo soko)* are among the most cultivated leafy vegetable.

Consumers' preference for organic leafy vegetables consumed.

Results in Table 3 indicates the consumers' preference for organic leafy vegetables consumed. The results showed that *Amaranthus (efo tete)* ($\bar{x}$=1.59) with the highest percentage was the most preferred organic leafy vegetables consumed, closely followed by *Celosia (efo soko)* ($\bar{x}$=1.50) and *Corchorus spp. (ewedu)* ($\bar{x}$=1.50) with the same mean was ranked second, This finding is in consonance with that of Ramdwar et al. (2017) who reported that *Amaranthus* leaves have been used as greens, just like spinach.

Table 3: Consumers' preference for organic leafy vegetables consumed.

Organic Leafy Vegetables	Most preferred	Preferred	Not Preferred	Mean	Rank
Fluted pumpkin (Ugu)	59(49.2)	45(37.5)	16(13.3)	1.36	4th
Amaranthus (efo Tete)	79(65.8)	33(27.5)	8(6.7)	1.59	1st
Celosia (efo Soko)	70(58.3)	40(33.3)	10(8.3)	1.50	2nd
Corchorus spp (ewedu)	68(56.7)	44(36.7)	8(6.7)	1.50	2nd
Oyster Mushroom	18(15.0)	39(32.5)	63(52.5)	0.63	6th
Gernodana Mushroom	22(18.3)	13(10.8)	85(70.8)	0.48	7th
Bitter leaf (ewuro)	29(24.2)	64(53.3)	27(22.5)	1.02	5th

Source: Field survey, 2024

Summary of consumer's perception towards consumption of organic leafy vegetables

Based on the responses to the perception statements, perception index was calculated with a maximum score of 54.0 and minimum score of 31.0 and mean of 43.5. The perception scores were categorised into favourable and unfavourable categories using above and below the mean criterion. As a result, 56.7% of the respondents have favourable perception towards consumption of Organic leafy vegetables while 43.3% had unfavourable perception towards consumption of Organic leafy vegetables in the study area and this might be because respondents in the study area were educated. Hence understand the benefits of consuming organic leafy vegetables

Factors influencing the consumption of organic leafy vegetables

Results in Table 5 showed the factors influencing the consumption of organic leafy vegetables. The results showed that availability of the vegetables (87.5%) had the highest percentage as one of the factors influencing the consumption of organic leafy vegetables.

Table 5: Factors influencing the consumption of organic leafy vegetables

Factors influencing the consumption of organic leafy vegetables	Yes	No
Health Condition	83(69.2)	37(30.8)
Availability of the vegetables	105(87.5)	15(12.5)
Taste of the vegetables	78(65.0)	42(35.0)
Awareness of the pesticide use	79(65.8)	41(34.2)
Cultural influences	67(55.8)	53(44.2)
Environmental consciousness	69(57.5)	51(42.5)
Consumer's income (High/Low)	77(64.2)	43(35.8)

Source: Field survey, 2024

Constraint to the consumption of organic leafy vegetables

Results in Table 6 showed the constraints to the consumption of organic leafy vegetables. The results revealed that relatively high price of organic vegetables/ Too expensive (mean=1.54) had the highest mean and was ranked first. Closely followed by unavailability of the produce (mean=1.50) was ranked second, lack of funds to purchase (mean=1.45) was ranked third, short shelf life of the vegetables (mean=1.40) was ranked fourth and seasonality of the produced (mean=1.32) was ranked fifth. This implies that relatively high price of organic vegetables is the major constraint to the consumption of organic leafy vegetables. The finding is in agreement with that of Adebooye and Ajayi (2008); Adebooye et al. (2003) and Adebooye et al. (2005) that identified the problems of organic vegetable consumption as being expensive and there are low number of organic produce market.

Table 6: Constraint to the consumption of organic leafy vegetables

Constraints	Major Constraint	Minor Constraint	Not A Constraint	Mean	Rank
Unavailability of the produce	67(55.8)	46(38.3)	7(5.8)	1.50	2nd
Lack of funds to purchase	67(55.8)	40(33.3)	13(10.8)	1.45	3rd
Lack of trust	34(28.3)	77(64.2)	9(7.5)	1.21	7th
Insufficient time to access organic market	39(32.5)	64(53.3)	17(14.2)	1.18	8th
Relatively high price of organic vegetables	75(62.5)	35(29.2)	10(8.3)		1st
Price fluctuation	41(34.2)	72(60.0)	7(6.8)	1.28	6th
Shelf life of the vegetables	54(45.0)	60(50.0)	6(5.0)	1.40	4th
Cultural belief	28(23.3)	54(45.0)	38(31.7)	0.92	9th
Seasonality of the produce	56(46.7)	46(38.3)	18(15.0)	1.32	5th

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

The study concluded that the consumers had preference for *Amaranthus (efo tete*) and *Celosia (efo soko}* and the respondents had favorable perception towards consumption of organic leafy vegetables. The factors influencing the consumption of organic leafy vegetables include the availability of vegetables and health conditions. The consumers in the study area were faced with relatively high prices of produce. It is recommended that consumers should consider growing their own organic leafy vegetables identified and the farmers should always ensure availability of the vegetables so as to encourage continuous patronage in the study area.

REFERENCES

Adebooye, O. C., Ogbe, F. M. D., Bamidele, J. F. (2003). Ethnobotany of indigenous leaf vegetables of southwest Nigeria. Delpinoa, Italy vol. 45;295-299.

Adebooye O. C., Ajayi SA, Baidu-Forson J. J. Opabode J. T. (2005). Seed constraint to cultivation and productivity of African indigenous leaf vegetables. Afr. J. Biotechnol. 4 (13):1480-1484

Adeoluwa, O. (2010). Consumers' perception of organic vegetables: Proceedings of the consumer–producer debate session, sponsored by NOAN, held at the Agronomy Department, University of Ibadan, Nigeria.

FAO (2001). Codex Alimentations – Organically Produced Foods, FAO, Rome. Fertilizer statistics 2003-04, The Fertilizer Association of India, New Delhi, 77p.

Kwakwa (2013), Pattern of dietary carbohydrate intake among urbanized adult, *Journal of Public Health and Epidemiology*.

Magnusson, M. K., Arvola, A., Koivisto-Hursti, U., Aberg, L. and Sjoden, P. (2003). Choice of organic food is related to perceived consequences for human health and to environmentally friendly behaviour, Appetite, 40: pp 109-117.

Ramdwar, M. N., Chadee, S. T., Stoute, V. A. (2017). Estimating the potential consumption level of amaranth for food security initiatives in Trinidad, West Indies. Cogent Food Agric., 3, 1321475

Van Jaarsveld, P., Faber, M., van Heerden, I., Wenhold, F., Jansen van Rensburg, W., van Averbeke, W. (2014). Nutrient content of eight African leafy vegetables and their potential contribution to dietary reference intakes. J. Food Compos. Anal. 2014, 33, 77–84.

PSYCHOSOCIAL AND ECONOMIC EFFECTS OF MAIDUGURI FLOODS ON DISPLACED POPULATIONS IN JERE COMMUNITIES, BORNO STATE

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ABSTRACT
Floods disasters are a recurring natural phenomenon that posed serious environmental challenges to people worldwide, causing distraction and disruption to livelihoods. It occurs in Nigerian environment when there is heavy rain fall for prolonged period. The purpose of this research is to investigate the socioeconomic and psychological effects of the Maiduguri September 2024 floods disaster on the livelihoods of Jere communities in Borno State. A multi-stage sampling procedure was used to select 375 displaced people for this study. To achieve the objectives of the study, both quantitative and qualitative descriptive research methods were employed. Quantitative Households Questionnaire and Qualitative Key informant Interview were used to collect data for the study. The findings of the study revealed that the floods disaster had negative impact on socio-economic livelihoods of the displaced communities in the study areas. Psychologically, they were traumatized. There is also clear evidence of damage to properties, roads, agricultural production, housing, health hazards, water and sanitation among others. Therefore, to improve the livelihoods of the displaced populations; the paper recommends that government, Non-governmental Organisations (NGOs), should empower the floods victims through funding and community training to become the first line of defence when floods occur. Community members should be well enlightened on the danger of encroachment and building houses on the waterways.
Keywords: Psychosocial effects, economic effects, livelihoods, Maiduguri flood.

INTRODUCTION

Floods are naturally caused by rising temperatures that eventually result in an extremely heavy downpour of rainfall, glacier melting and also thermal expansion by the oceans beyond their banks, subsequently resulting in a rise in sea levels and causing coastal lands to experience inundation (Etuonovbe, 2009).

Smith & Ward, 1998; Kattumuri, 2018 and Jiang *et al*., 2023) reiterate that floods happen when water overflows onto land that is usually dry, often near rivers, lakes, or streams. They are mainly caused by heavy or long-lasting rainfall. This occurs when water spreads beyond its normal boundaries, covering areas that are not usually underwater. Merten *et al*. (2021) opined floods are purely environmental hazard that result from several basic causes of which the most frequent are climatologically in nature, but very often induced by man's improper utilization or abuse of the environment. Flood is considered the world's worst global hazard in terms of its magnitude, occurrence and geographical spread, loss of lives and properties, and displacement of people and socio-economic activities (Mukoro *et al*., 2015).

Nigeria is one of the most flood-prone countries in West Africa. In 2022, severe flooding led to the loss of over 600 lives and affected about 3.2 million people in 34 states out of 36 states (Ongoma and Dike, 2023; International organization of Migration [IOM], 2024. The destruction of over 569, 251 hectares of farmland in Nigeria underscores the profound consequences of flooding (Ongoma & Dike, 2023). The Nigerian Meteorological Agency (NMA) identifies Borno state as one of the high-risk states for floods, with instances documented (Ejike, 2022). The aftermath of the Maiduguri September 2024 floods has been impactful, submerging homes and farmlands and displacing hundreds of thousands of residences. The annual precipitation period in Nigeria typically commences in April, with the peak intensity of rainfall occurring between June and September. During the interval of August to September 2024, substantial precipitation impacted numerous Local Government Areas (LGAs) in Borno State, leading to considerable inundation that has severely affected various communities. Moreover, on 9 September 2024, Maiduguri experienced a significant flooding event as a consequence of the failure of the Alau dam situated in the adjacent Konduga LGA.

The Maiduguri September 2024 floods have caused severe damage to roads, buildings, and farmland, disrupting livelihoods and forcing many families to leave their homes. According to Balogun et al. (2020) flood disasters. disrupt sustainable development and growth. The damages caused by flooding are increasing and most of these destructions can be noticed in developing societies Changes in climate and human activities have made flooding worse, leading to more displacement across Nigeria. Between September 4 and 12, 2024, the Displacement Tracking Matrix (DTM), in partnership with the National Emergency Management Agency (NEMA), the Borno State Emergency Management Agency (BOSEMA), and the Nigerian Red Cross Society (NRCS), identified 138 locations in Borno State that were either flooded or received people displaced by the disaster (Danasabe, et al 2025). Using reports from key

informants, field teams, and close coordination with humanitarian organizations and local authorities, DTM assessed these locations to understand the needs and challenges of the affected people. In 19 local government areas (LGAs) of Borno State, the assessment found that 320,791 people from 65,731 households were affected by the floods. This included both displaced individuals and those who remained in their communities despite the flooding. The affected population included 122,774 displaced individuals and 108 returnees (IOM, 2024). The incidence came with its antecedents which include social, economic, physical and mental effects on the households especially the vulnerable households.

Experiencing natural disasters can lead to various psychological disorders. The most common ones include depression, severe anxiety, and post-traumatic stress disorder (PTSD) (Breslau, Chase & Anthony, 2002; Norris, 2005). Among these, PTSD is the most frequently reported. Its symptoms include reliving the traumatic event, emotional numbness, avoidance of reminders, and heightened alertness (American Psychiatric Association, 2000). However, not everyone exposed to disasters develops PTSD, as individual responses to trauma vary. Events themselves are not automatically traumatic but are perceived differently by each person. Since there is limited research specifically on flooding (Norris, 2005), studies on other disasters may help in understanding its psychological impact. While PTSD is widely recognized as a common effect of natural disasters, estimates of how often it occurs differ significantly.

This incidence has its effects on social, economic and psychological effect which has not been clearly understood from the DTM assessment. The trauma, anxiety and fear of recurrence of the incidence will continue to leave the affected people in shocks thereby limiting their existence and wellbeing. This calls for an investigation of socioeconomic and psychological effects Maiduguri September 2024 flooding in the study area in Borno state, and the coping strategies adopted as well as the interventions gotten from Government and non-NGOs. The study set out to investigate the vulnerable areas with the following specific objectives:

1. Describe the socioeconomic characteristics of respondents in the study area.
2. Examine the psychological effects experienced by the displaced populations.
3. To investigate the immediate social effects of flooding on displaced populations
4. Economic losses experienced by displaced population in Jere due to the September 2024 floods the floods

METHODOLOGY

This study was carried out in Jere Local Government Area of Borno State. The study examines the psycho-social and economic effects of the Maiduguri flooding on Displaced Populations in Jere Communities using a cross-sectional postal survey of individuals affected by the disaster. Jere local government area is one of the 27 local governments that made up Borno State. The local government is predominantly an agrarian community with vast land space of 793.4km^2 that enhances agricultural production. A multistage sampling procedure was used to select 372 respondents (160 male and 212 females from the flooded communities in the study area. The instrument for data collection was a self-structured questionnaire designed in a 4-point rating of agreement which elicited information on each research question. Interview was scheduled for those who could not respond to the questionnaire properly. Data was analyzed using mean and standard deviation with a criterion mean of 2.50 and above which was the benchmark for agreement, while any item with a mean score below 2.50 was disagreed.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The results in Table 1 represent the socioeconomic characteristics of the floods displaced population in Jere community in Borno state. The findings indicate that the majority (58.9%) were male while (41.1%) were female. The data on age of the respondents revealed that (28.5%) of the respondents were between the age of 41-50 years while the least age breakage was 60 and above years. The outcome also revealed that most respondents were married (56.7%), while (19.1) were single and (24.2%) were widows/widowers. The socioeconomic characteristics of the respondents further show that 42.7% and 11.2 % of the respondents had a family size of 6-11 persons and 16-20 persons respectively in their household. 54.2% of the respondents were farmers, while 29% and 18.5% of them were traders and civil servants.

Psychological effects of the Maiduguri flood on Jere communities

Table 2 shows that post traumatic disorder (3.89) is the most reported psychological effect of flood in Jere community. This was followed by depression (3.88); sleeping disturbance (3.87) and loss sense of security (3.86). The least reported psychological effects of floods include increased in abuse of substance (2.99); emotional distress (3.09); increased in blood pressure (3.22) and grief and bereavement (3.32). The high rates of PTD, depression, sleeping disturbances and loss sense of security show the urgent need for mental health support in Jere community in Borno State.

Table 1: Socioeconomic characteristics of respondents

Sex	Frequency	Percentage (%)
Male	208	55.9
Female	164	41.1
Age		
20 – 30	46	12.4
31 – 40	87	23.4
41 – 50	106	28.5
51 – 60	95	25.5
Above 60	38	10.2
Marital status		
Single	71	19.1
Married	211	56.7
Widow/widower	90	24.2
Household size		
1 to 5	93	25
6 to 11	159	42.7
12 to 15	78	21
16 to 20	42	11.3
Occupation		
Farmer	195	52.4
Trading	108	29.0
Civil servants	69	18.5
Total	372	100

Source: Field survey, 2025

Table 2: Mean Score of the flood displaced population on the psychological effects of the Maiduguri flood on Jere communities

S/N	Variables	N	Mean	Remark
1	Post traumatic disorder	372	3.89	Accept
2	Depressed for loss of means of livelihood	372	3.88	Accept
3	Loss sense of security	372	3.86	Accept
4	Emotional distress	372	3.09	Accept
4	Fear of reoccurring	372	3.41	Accept
5	Sleeping disturbance	372	3.87	Accept
6	Increase blood pressure	372	3.22	Accept
7	Increase in abuse of substance	372	2.99	Accept
9	Grief and bereavement	372	3.23	Accept
10	Lost my identity	372	3.77	Accept

Source: Field survey, 2025

Table 3: Mean score of the floods displaced people on the social effects of the Maiduguri flood

S/N	Variables	N	Mean	Remark
1	Separation from family members	372	3.79	Accept
2	Displacement from place of residence	372	3.89	Accept
3	Limited access to nutritious food.	372	3.88	Accept
4	Loss of portable drinking water	372	3.72	Accept
4	Lack of inadequate health facilities.	372	3.09	Accept
5	Children's educations were disrupted	372	3.41	Accept
6	Tension and conflicts over resources	372	2.99	Accept
7	Forced migration	372	3.59	Accept
9	Loss of loved ones	372	3.12	Accept
10	Lead to emergence shelter	372	3.22	Accept

Source: Field survey, 2025

Result in Table 3 shows the social impact of the Maiduguri floods of September 2024 on Jere population. Findings show that majority of the households in Jere Local Government Area of Borno were displaced from their place of residence with a mean of 3.89 and SD 1.79; Limited access to nutritious food (3.88); Separation from family members (3.79); Child exploitation and abuse

(3.77). Other less social effects of the floods include loss of loved ones (3.22) and tension and conflicts over resources (2.99).

Table 4: Mean score of the floods displaced population on the economic effect of the Maiduguri flood

S/N	Variables	N	Mean	Remark
1	Loss of livelihood	372	3.89	Accept
2	Destruction of properties	372	3.88	Accept
3	Increased cost of living	372	3.09	Accept
4	Loss of animals	372	3.67	Accept
5	Loss of cars/tricycles	372	2.88	Accept
6	Destruction of business	372	3.22	Accept
7	Distraction of infrastructures	372	3.12	Accept
8	Loss of farmlands	372	3.78	Accept

Source: Field Survey, 2025

Findings in Table 4 show that majority of the floods displaced population in Jere community have lost their livelihood with a mean of 3.89; destruction of properties (3.88). Other damages include increased cost of living (3.09); destruction of business (3.22) and destruction of infrastructures. The table also revealed that flooding destroys animals (3.78) and farmland (3.67) in Jere communities of Borno state.

CONCLUSION AND RECOMMENDATION

In conclusion, the findings provide a clear picture of the devastating consequences of flooding in Borno State. The widespread displacement of households, destruction of infrastructure, and loss of livelihoods has had a profound impact on the lives of affected communities. Addressing the long-term effects of this disaster requires a well-organized effort from government agencies, humanitarian groups, and the international community. The high rates of PTSD, anxiety, and fear of future flooding highlight the urgent need for mental health support in Borno State. These conditions can greatly affect people's well-being and daily lives. The paper, therefore, recommended that, the disaster management agency should be adequately funded by government and partner with cooperate organizations, NGOs and spirited individuals to be proactive in flood forecasting and evacuation process. Medical support, provision of temporary shelters, seeds, and provision of farming implement will greatly improve the livelihood of the displaced population in the study area.

REFERENCES

Albarrán C.R., Nyamathi A. (2011). HIV and Mexican migrant workers in the United States: A review applying the vulnerable populations conceptual model. J Assoc Nurses AIDS Care.; 22: 173–85. https://doi. org/10.1016/j.jana.2010.08.00

American Public Health Association. Climate changes health: Mental wellness. APHA; (2019). https://www.apha.org/topics-and-issues/climate-change/mental-wellness.

Egya, S. E. (2021). 'Sea-salt rides its currents to the city': Lagos and the poetics of flooding. Postcolonial Studies, 24(3): 384-398.

Apan, C. (2010). Environmental impact of flooding on agricultural produce in Cross-Rivers State. *International Journal of Environmental Science* 3 (2) 21-31

Danasabe et al (2025). Psychological Impact of Climate Change Displaced on Flood Victim in Maiduguri, Borno State, Nigeria. Journal Arid Zone economy 5(8). pp.24-33. http://resources.jaze.com.ng/index.php/jaze/login

Ejike M.O. Dossen, B.S. and Ebuenyi, I.D. (2022). Flooding in Nigeria, towards prioritizing mental health and psychosocial support. *Pan African Medical Journal*. 43(199)10.11604/pamj.2022.43.199.38251

Flaskerud JH, Winslow BJ. (1998). Conceptualizing vulnerable populations health-related research. Nurs Res. 1998; 47: 69–78. DOI: https://doi.org/10.1097/00006199-199803000-00005

Jiang, H., Zhang, J., Liu, Y., Li, J. & Fang, Z.N. (2023). Does flooding get worse with subsiding land? Investigating the impacts of land subsidence on flood inundation from Hurricane Harvey. Science of the Total Environment, 865: 161072

Kattumuri, R. (2018). Sustaining Natural Resources in a changing environment: Evidence, policy and impact. Contemporary Social Science, 13(1): 1–16.

Merten, J., Nielsen, J.O., Soetarto, E. & Faust, H. (2021). From rising water to floods: Disentangling the production of flooding as a hazard in Sumatra, Indonesia. Geoforum, 118: 56 – 65.

Sethi, M. & Creutzig, F. (2021). Covid-19 recovery and the global urban poor. Npj Urban Sustainability, 1(23): 1 – 5.

Smith, K .and Ward, R. (1998). Floods: Physical processes and Human effects. John Wiley and son. England.

Twaibu, S. & Okidi, L.P. (2021). Behavioural dumping and drainage channels. East African Journal of Engineering, 3(1): 72–78.

White BP, Breakey S, Brown MJ, Smith JR, Tarbet A, Nicholas PK, Ros AMV (2023). Mental Health Impacts of Climate Change Among Vulnerable Populations Globally: An Integrative Review. *Annals of Global Health.*; 89(1): 66, 1–19. DOI: https://doi.org/10.5334/aogh.4105

World Health Organization (2019). Mental health, poverty and development. World Health Organ. https://www.who.int/mental_health/policy/development/en/.

ANALYSIS OF INDIGENOUS ADAPTATION STRATEGIES AGAINST CONFLICTS BETWEEN ARABLE CROP FARMERS AND FULANI HERDSMEN: IMPLICATION FOR FOOD SECURITY IN OYO STATE, NIGERIA

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ABSTRACT
This study examines indigenous adaptation strategies (IASs) used by arable crop farmers in Saki and Ibarapa zones of Oyo State to mitigate conflicts with Fulani herdsmen and the implications for household food security. Using a multistage sampling technique, 120 farmers were surveyed across four LGAs. Descriptive statistics and Pearson correlation were applied. Key IASs identified were community dialogue (Mean=4.72), traditional warning systems (Mean=4.58), and crop diversification (Mean=4.41). Correlation analysis indicates strong, statistically significant positive relationships between IAS effectiveness and household food availability (r=0.723), access (r=0.655), and supply stability (r=0.681), all $p < 0.01$. The study recommends a hybrid conflict-resolution framework integrating indigenous mechanisms with formal state support.
Keywords: Farmer–Herdsmen Conflict; Indigenous Adaptation Strategies; Food Security; Oyo State, Nigeria.

INTRODUCTION

Competition for land and water between settled arable crop farmers and itinerant Fulani herdsmen has intensified in many parts of Nigeria. In Oyo State, particularly within the Saki and Ibarapa agricultural zones, these tensions have manifested in farm destruction, population displacement, and reduced agricultural production. Drivers include population growth, shrinking arable land, climate variability, and weak enforcement of land-use policies. These conflicts undermine food security by reducing cultivated area, interrupting farming cycles, and increasing production risk.

Existing literature highlights multiple causes of farmer–herdsmen conflicts: grazing encroachment, crop damage, inadequate land tenure systems, cattle rustling, and environmental change (Adelakun et al., 2015; Ofem & Inyang, 2014; Adisa, 2011). Research also shows traditional institutions, community elders, chiefs, and customary laws, play significant roles in local dispute resolution, though their capacity is constrained under widespread violence (Mgbenka & Mbah, 2019; ICG, 2020). Studies link such conflicts to deteriorating food security indicators (Olayanju et al., 2020). This study builds on that literature by empirically linking IAS effectiveness to household food security outcomes in Oyo State.

METHODOLOGY

A multistage sampling procedure selected two agricultural zones (Saki and Ibarapa), four LGAs (Saki West, Iwajowa, Ibarapa East, Ibarapa North), and eight rural communities known for farmer–herder clashes. From each community, 15 arable crop farmers were randomly sampled, yielding 120 respondents. Data were collected via a pre-tested structured questionnaire covering socioeconomic variables, prevalence and effectiveness of IASs (5-point Likert scales), and food security indicators adapted from HFIAS. Analysis used frequencies, means, and Pearson correlation (SPSS v28).

RESULTS AND DISCUSSION

Table 1: Socioeconomic characteristics of respondents (n=120)

Variables	Summary	Notes
Gender	70% male, 30% female	Typical rural farming population
Mean age	47.1 years	Mature, experienced farmers
Education	41.7% secondary, 29.2% primary	Reasonable literacy
Farm size	65.8% <5 ha	Smallholder-dominated
Experience	Mean 17.8 years	Knowledgeable respondents

Source: Field survey, 2025.

Table 2: Mean Scores of prevalent indigenous adaptation strategies (n=120)

Strategy	Mean (5-pt scale)	Implication
Dialogue/mediation by community leaders	4.72	Primary conflict-deescalation channel
Traditional warning systems (bells/whistles)	4.58	Early detection, community mobilization
Crop diversification (edge planting)	4.41	Reduces crop palatability to cattle
Payment of token to herdsmen	3.95	Contested, burdensome
Leaving fallow for grazing	3.60	Risk-sharing but reduces cropping area

Source: Field Survey 2025

Table 2: Prevalent IASs. Scale: 1=Never to 5=Very frequently used. Correlation analysis (Table 3): shows strong positive relationships between IAS effectiveness and food security indicators. These associations suggest that where IASs are effectively employed, households report higher food availability, better access, and greater supply stability.

Table 3: Test of relationship between food security and indicators

Food security indicator	Correlation (r)	Significance
Household food availability	0.723	$p < 0.01$
Access to adequate food	0.655	$p < 0.01$
Stability of food supply	0.681	$p < 0.01$

Source: Field survey, 2025.

CONCLUSION AND RECOMMENDATIONS

Indigenous adaptation strategies remain critical for immediate conflict management and protection of local food production in Oyo State. Community dialogue and early-warning systems are especially valuable. However, escalating violence can overwhelm local mechanisms. A hybrid approach—integrating customary institutions into formal conflict-resolution frameworks and providing targeted security support during peak farming seasons—will strengthen resilience and food security.

Recommendations are as given below:

1. Integrate respected community elders into official state and local conflict mediation committees.
2. Document and disseminate effective IAS practices and train extension officers to advise on conflict-sensitive cropping.
3. Deploy targeted security support (mobile units) during planting and harvest seasons to back indigenous mechanisms.
4. Promote livelihood diversification and compensation frameworks to reduce incentives for violent escalation.

REFERENCES

Adegbeye, T. (2022). Geopolitics of Farmer–Herder Conflicts in Southwestern Nigeria. Ibadan University Press.

Adelakun, O., Adurogbangba, B., & Akinbile, L. (2015). Socioeconomic effects of farmer–herdsmen conflict in Nigeria. Journal of Rural Studies, 39, 91–99.

Adisa, R. S. (2011). Management of farmer–herdsmen conflicts in North-Central Nigeria. Journal of Development and Agricultural Economics, 3(8), 362–370.

Ajayi, A. R., & Ajayi, O. O. (2020). Indigenous conflict management strategies in Nigerian agriculture. Journal of Agricultural Extension, 24(2), 45–56.

International Crisis Group (2020). Stopping Nigeria's Spiralling Farmer–Herder Violence. Africa Report No. 262.

Olayanju, T. A., Adeyonu, A. G., & Ogunjimi, S. I. (2020). Effect of farmer–herder conflict on food security of farming households in Kwara State. Asian Journal of Agricultural Extension, 38(10), 1–11.

SOURCES OF AWARENESS ON POST-HARVEST MANAGEMENT PRACTICES AMONG TOMATOES FARMERS IN NIGER STATE, NIGERIA

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ABSTRACT

The study examines the sources of awareness on post-harvest-management practices among tomatoes farmers in Niger State, Nigeria. Sample size of 180 tomato producers were selected using multi-stage sampling procedure. Structured questionnaire complimented with interview scheduled were used for data collection. Data were analysed using frequency count, percentage, and mean. The result revealed that there was high awareness on the post-harvest management of tomatoes among farmers apart from use of crates in packing of tomatoes where only (11.1%) of the farmers showed their level of awareness. More so, other farmers (80.5%) and farm forum (71.2%) were the major sources of awareness on post-management practices of tomatoes. Also, 87.2% of farmers had high knowledge in processing tomato to paste and 86.6% on keeping tomatoes away from sunlight. Shortage of funds (92.8%) and high cost of post-harvest materials (88.9%) were the mostly encountered constraints to post-harvest management practices among tomato farmers. It is recommended that funds should be made available to farmers to purchase post-harvest materials processing.

Keywords: Awareness; Post-harvest, Management, Tomatoes.

INTRODUCTION

Tomato (*Lycorpesicon esculentum*) is vital at supplying human populace with vitamins and minerals required for growth and body nourishment. Tomatoes are mostly produced in Northern Nigeria as a result suitable agro-climatic condition that favoured mass production and due to government support for dry season farming (Muhammed *et al.*, 2012). About 1.8 million metric tons of tomatoes are produced in Nigeria Annually. Out of which 1.44 million metric tonnes that is about 80% produced are in Northern region (Rockefeller Foundation, 2021). Tomatoes are either fresh or processed into paste. Tomatoes are not only seasonal but highly perishable and deteriorate due to inadequate processing facilities and inadequate sources of awareness on post-harvest management of tomatoes. Post-harvest management is defined as methods or system applied to farmers' produce after harvesting purposely for preservation, conservation, quality control/enhancement, processing, packaging, storage, distribution, marketing, and utilization to meet the food, nutritional and monetary requirements of consumers, and also to enhance their livelihood and wellbeing status (Pelemo *et al.*, 2019). Despite the increase in tomato production in Nigeria, more than 1.3 million metric tons of tomatoes are imported annually (Rockefeller Foundation, 2021). The losses encountered by farmers could have been avoided with proper awareness of the opportunities embedded in post-harvest management. Therefore, it is expected that adequate awareness on post-harvest management practices and exposure of will address the challenges facing tomato farmers in Niger State. The aim of this study is to examines the sources of awareness on post-harvest-management practices among tomatoes farmers in Niger State. The specific objectives are to examine level of awareness on post-harvest management in tomatoes; identity the sources of awareness on the post-harvest management of tomatoes; and identity constraints to post-harvest management of tomatoes.

METHODOLOGY

The study was done in Niger State of Nigeria. The State is situated in the Guinea Savannah ecological zone of Nigeria, with largest land mass among the states in Nigeria with total land area of 76,364 km^2 accounting for about eight percent of Nigeria land areas. About 95% are good for arable land production of staple crops like rice, cassava, and guinea corn. Tomatoes are produced by most farmers in the State. The state lies between Longitude 3^o 30' and 7^o 20' East & Latitude 8^o 20' and 11^o 30' North, with a population of about 3,950,249 (National Population Commission) NPC 2006 with a growth rate of 3.9%. The State has an estimated population of 6,374,000 in 2018 (Niger State Geographical Information System (NSGIS), 2018). Multi-stage sampling procedure was employed for this study. The first stage involved selection of three (3) Agricultural zones of the State The second stage involved random selection of one (1) Local Government Areas from each of the zone. The third stage involved random selection of four (4) communities each from the selected LGAs. The fourth stage involved the use of proportional

sampling to select 10% of the respondents making a total of 180 sample size. Primary data was used for this study. Data was collected by researchers assisted by trained enumerators using questionnaire and complimented with interview schedules. Objectives i, ii, and iii were achieved using descriptive statistics (frequency, percentages and mean).

RESULTS AND DISCUSSION

Level of awareness on post-harvest management in tomatoes

Table 1 indicated high level of awareness of apart from use of crates in packing of tomatoes where only (11.1%) of the farmers showed their level of awareness. High level of awareness on post-harvest management of tomatoes was because majority of the households produce tomatoes not necessary for sales but consumption purposes.

Table 1: Distribution of the farmers according to level of awareness on post-harvest management in tomatoes (n=180)

Post-harvest management	Aware Freq (%)	Not aware Freq (%)
Sorting methods		
Sorting based on size and colour	180 (100)	0
Grading methods		
Fully ripe grading	180 (100)	0
Half ripe grading	180 (100)	0
Packing materials		
Bag/nylon sack	180 (100)	0
Traditional baskets	180 (100)	0
Crates	20 (11.1)	160 (88.9)
Storage methods		
Store in cool place	180 (100)	0
Keep away from sunlight	180 (100)	0
Transportation methods		
Lorries/truck/pickup	180 (100)	0
Motorcycle	180 (100)	0
Fuel tankers	152 (84.4.)	28 (15.7)
Human labour	180 (100.)	0
Preservation methods		
Sun dried into chips	180 (100)	0
Cold water bath	180 (100)	0
Fresh frozen	180 (100)	0
Processing methods		
Processed into jams	180 (100)	0
Processes into juice	180 (100)	0

Sources: Field survey, 2018

Sources of awareness on post-harvest management of tomatoes

Results in Table 2 indicated that other farmers (80.5%), farm forum (71.7%) and friends (70.6%) were the major sources of awareness on post-harvest management of tomatoes in the study area. The findings showed that other farmers, farmers forum and friends were the major sources of awareness on post-harvest management of tomatoes.

Table 2: Sources of awareness on post-harvest management of tomatoes (n=180)

Sources of awareness*	Freq (%)	Rank
Other farmers	145 (80.5)	1st
Farm forum	129 (71.7)	2nd
Friends	127 (70.6%	3rd
Extension officers	123 (68.3)	4th
Community meeting	68 (37.8)	5th
Mass media	55 (30.6)	6th
ADP	30 (16.7)	7th
Ministry of agriculture	29 (16.1)	8th
Parents	22 (12.2)	9th
Field days	20 (11.1)	10th

Sources: Field survey, 2018, *Multiple responses

This finding agreed with Tsado *et al.* (2018), who stressed that other farmers and friends were the major sources of information on the improved rice varieties in Niger State, Nigeria.

Constraints to Post-Harvest Management of Tomatoes

Table 3 showed that shortage of funds (92.8), high cost of post-harvest materials (88.9%), inadequate training on post-harvest management (88.3%) and inadequate market information (85.0%) were the most constraint to post-harvest management of tomatoes in the study area. This finding concurs with that of Pelemo *et al.* (2024) who reported that funds is a major constraint facing maize farmers in Kogi State, Nigeria.

Table 3: Distribution of respondents according to constraints to post-harvest management of tomatoes (n=180)

Constraints	Freq (%)	Ranking
Shortage of funds	167 (92.8)	1st
High cost of post-harvest materials	160 (88.9)	2nd
Inadequate trainings on post-harvest	159 (88.3)	3rd
Inadequate market information	153 (85.0)	4th
Inadequate infrastructure	148 (82.2)	5th
Inadequate credit facilities	145 (80.5)	6th
Transportation challenge	127 (70.6)	7th
Unattractive income	123 (68.3)	8th
Low level of participation by farmers	119 (66.1)	9th
Inadequate technical knowledge	102 (56.7)	10th

Sources: Field survey, 2018, *Multiple responses

CONCLUSION AND RECOMMENDATIONS

It can be concluded that other farmers and farm forum were the major sources of awareness on post-harvest management of tomatoes. Also, majority of farmers had high awareness of the management practices in tomatoes. Shortage of funds, high cost of post-harvest materials, and inadequate training on post-harvest management of tomatoes. It is recommended that funds should be made available to farmers to purchase post-harvest materials processing. Other sources of information should be prioritize for farmers in the study area.

REFERENCES

Muhammad, R. H., Hionu G. C. and Olayemi, F. F. (2012). Assessment of the post-harvest knowledge of fruits and vegetable farmers in Garun Mallam L.G.A of Kano, Nigeria, *International Journal of Development and Sustainability*, 1 (2): 510-515.

National Population Commission (NPC), (2006). Year book on Nigeria population data. Report of the NPC. Retrieved from http://www.jstor.org. Retrieved on 02/02/17.

Pelemo, J. J, Mohammed, U., Omaku, M. and Opara, S. (2019). Analysis of Poverty Status of Cashew Farmers in Kogi State, Nigeria. *Agrosearch*, 19 (2): 16-25.

Pelemo, J. J., Ajibola, B. O., Yisa, K. M., Kolo, P. M., Silas, Y. G. and Yakubu, N. O. (2024). Analysis of Post-harvest Management Training Needs for Maize Growers in Kogi State, Nigeria, *proceeding of the 58th Annual Conference of Agricultural Society of Nigeria* held at University of Abuja, between 21–25 October, 637-641

Rockefeller Foundation (2021). State in the Yield wide Tomato Programme, Pp.1-8.

Tsado, J. H., Ajayi, O.J., Tyabo, I.S., Pelemo, J. J. & Adebayo, E. (2018). Socio economic analysis of rice farmers uptake of improved seeds for enhanced well-being in Wushishi community In Niger State, Nigeria. Paper presented at 27th Annual Conference of Rural Sociology Society of Nigeria RUSAN held at Ahmadu Bello University Zaria, 7th-11th October.

EMPLOYEES' CONFLICT HANDLING BEHAVIOUR AND THEIR JOB PERFORMANCE IN THE FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA

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ABSTRACT

This study examined the conflict handling behaviours of employees at the Federal University of Agriculture, Abeokuta. A multi-stage sampling technique was employed to select 128 participants. Data were collected on respondents' socio-economic characteristics, conflict handling behaviours, and job performance. Both descriptive and inferential statistical methods were used to analyse the data. Findings revealed that most respondents were male (53.6%), married (89.6%), Muslim (54.2%), PhD holders (68.8%), Yoruba (79.2%), and senior staff (89.6%), with an average age of 47.14 years, work experience of 15.67 years, and a monthly income of ₦201,802.08. The study identified exchanging accurate information with colleagues to collaboratively solve problems ($\bar{x}$ = 4.23) as the primary conflict handling behaviour among respondents, while the ability to plan work to meet deadlines ($\bar{x}$ = 4.76) was the most common factor influencing job performance. Overall, respondents demonstrated a high level of job performance (96.9%). A significant positive relationship was found between conflict handling behaviour and job performance (r = 0.340). The study concluded that employees predominantly used information-sharing as a conflict management strategy and recommended that organisations encourage staff to adopt effective conflict handling behaviours to enhance job performance.

Keywords: Conflict, Conflict Handling Behaviour, Employees, Job performance, FUNAAB

INTRODUCTION

Conflict is an unavoidable factor of organisational existence, and its control can significantly influence employee's overall performance. Conflict handling conduct refers to the techniques people use to cope with and manipulate place of work conflicts. These behaviours include taking part, compromising, accommodating, fending off, and competing. Effective conflict handling can help to build trust and cooperation, and to create a more positive and productive working environment (Kolb and Bartunek, 2017). Employees' job performance is a critical factor in the organisation and also an essential element in the success of any organisation. It refers to the productivity, efficiency, and quality of work that employees demonstrate in their job roles (Lestari *et al*., 2024). The way conflicts are handled within an organisation can have a significant impact on the job performance of employees. According to Addison and Teixeira (2021), worker overall performance is the rate to which a worker fulfils their obligations primarily based on enterprise expectancies, abilities, revel in, time, and determination. Effective conflict control strategies are essential for keeping an effective and efficient paintings environment. Poorly controlled conflicts can decrease performance and morale. Management's technique to conflict decision can impact employee reactions and job overall performance. Also, there is still a need to understand the unique results of conflict with respect to job performance, highlighting the importance of this study in determining its effect on worker overall performance.

The specific objectives were to;

1. Identify the socioeconomic characteristics of the respondents in the study area.
2. Identify the perceived causes of conflict in the study area.
3. Describe the conflict handling behavioural techniques used by the employees in the study area
4. Determine the level of Job performance in the study area.
5. Identify the factors affecting employees' job performance in the study area.

Hypotheses of the study are as stated below:

$H_0$1: There is no significant relationship between respondents' socioeconomic characteristics and their job performance.

$H_0$2: There is no significant relationship between conflict handling behaviour techniques and job performance of the respondents in the study area

METHODOLOGY

The study was carried out at the Federal University of Agriculture, Abeokuta. A multi-stage sampling technique was employed to select 128 participants. Data were collected on respondents' socio-economic characteristics, conflict handling behaviours, and job performance. Descriptive statistics, such as mean, frequency count, standard deviation, and percentages, while inferential statistics which includes Chi-Square and Pearson Product Moment Correlation (PPMC) were used to analyse the results acquired from the examine.

RESULT AND DISCUSSION

Socioeconomic characteristics

The result indicated that 34.4% of respondents is between 36-45 years of age. This shows that majority of the respondents is in an older age range. Daskalopoulou *et al* (2019) opined that humans inside this age group are economically effective. Additionally, 56.3% of respondents were male indicating a better variety of male respondents in the study area. Adeogun *et al*., (2018) opined that male

respondents are extra distinguished in their fields particularly in agricultural and biological sciences. Also, the results revealed that 68.8% of respondents held PhDs, indicating that most employees have the essential instructional qualifications for his or her roles in the academic institute. Wiche *et al*., (2023), who emphasised that personnel possessed the simple know-how required to perform their obligations correctly and contribute to the organisation enterprise's desires. Additionally, the survey showed that 70.9% of respondents had been employed by the institution for 11years or longer. This shows that most staff members have been with the university for a considerable amount of time, suggesting a high degree of employee retention. These results are in line with the findings of Adeogun *et al*. (2018), who noted that many academic staff members in the research area had worked there for more than 20 years. In terms of pay, 59.4% of participants were paid between ₦150,001 and ₦250,000 per month. Oyeyinka *et al.* (2017) assert that a comparatively high compensation can encourage workers to deliver quality work.

Table 1: Socioeconomic characteristics of the respondents (n=157)

Variables	Frequency	Percentage	$\bar{x}$	S.D.
Age				
35years and Below	11	11.5		
36years - 45 Years	33	34.4	47.14	9.26
46 Years - 55 Years	27	28.1		
56years and above	25	26.0		
Sex				
Male	54	56.3		
Female	42	43.8		
Level of education				
NCE	3	3.1		
OND	4	4.2		
HND	2	2.1		
B. Sc/B. Agric	2	2.1		
M. Sc/M. Agric	19	19.8		
PhD	66	68.8		
Years of working experience				
10years and Below	28	29.2		
11years – 20years	38	39.6	15.67	6.84
21years and above	30	31.3		
Income				
N 150000 and Below	24	25.0		
N 150001 - N 250000	57	59.4		
N 250001 - N 350000	12	12.5	201,802.08	57,255.95
N 350001 and above	3	3.1		

Source: Field Survey, 2023

Perceived causes of conflict in the study area

The results discovered numerous insights into perceived causes of conflict in the study area. The quantity of work given was unreasonable ($\bar{x}$ = 3.63), and conflicts often arose because colleagues replied lately or not at all to messages ($\bar{x}$ = 3.62). This suggests that excessive job demands and poor communication among staff cause stress, misunderstandings, and conflicts within the organisation.

Table 2: Perceived causes of conflict in the study area (n=157)

Statements	M	S. D
The amount of work I am given is reasonable	3.63	0.98
My colleagues' late response to message or not responding at all leads to conflict	3.62	0.87
I understand my co-worker's strength and weakness	3.54	0.91
There is a system in the organisation that allow us to lodge complaints when we have any issue concerning management	3.50	1.14
Personality difference among myself and my co-workers cause conflict	3.52	1.04
My superior reacts furiously when I don't meet my expectation during the stipulated time	3.16	1.09
My superior expectations are tasking	3.06	1.04

Source: Field Survey, 2023; Note: M = Mean, SD= Standard Deviation

In essence, these findings imply that improving workload distribution and communication efficiency could substantially reduce conflicts in the study area. Poorly handled place of work conflicts may have sizeable direct and indirect expenses for employers, personnel, and standard organisational performance and effectiveness (Anand & Mitra, 2022).

Conflict handling behavioural techniques used by the employees in the study area

Based on Table 4's results, it revealed that respondents exchange accurate information with coworkers to solve problems together ($\bar{x}$ = 4.23), as they bring all concerns out in the open so that the issues can be resolved in the best possible way ($\bar{x}$ = 4.10) while negotiating for a compromise with their co-workers ($\bar{x}$ = 4.03) in order to handle conflict in the best way possible. This result implies that respondents in the study area may have adopted constructive and collaborative approaches to manage workplace conflict. Overall, the result implies that employees in the study area possess positive conflict-handling behaviours, characterised by openness, cooperation, and a willingness to negotiate, which can enhance team cohesion and organisational effectiveness. Yusuf & Abolade, (2025), noted that collaborative and compromising strategies often lead to more sustainable resolutions and improved interpersonal trust in organisations.

Table 3: Conflict handling behavioural techniques used by the employees (n=157)

Statements	M	S. D
I exchange accurate information with my co-workers to solve a problem together	4.23	0.47
I try to bring all our concerns out in the open so that the issues can be resolved in the best possible way	4.10	0.62
I negotiate with my co-workers so that a compromise can be reached	4.03	0.55
I accommodate the wishes of my co-workers	3.93	0.63
I try to investigate an issue with my co-workers to find a solution acceptable to us	3.91	0.74
I use give and take so that a compromise can be made	3.82	0.69
I propose a middle ground for breaking dead lock	3.79	0.69
I go along with the suggestions of my co-workers	3.72	0.99

Source: Field Survey, 2023; Note: M= Mean, SD= Standard Deviation

Level of job performance in the Study Area

The result indicated that respondents were able to set priorities ($\bar{x}$ = 4.50) as they accept and learn from feedback ($\bar{x}$ = 4.48) while they also kept in mind the work result that they needed to achieve ($\bar{x}$ = 4.41). This result implies that respondents demonstrate a high level of self-management and goal-oriented behaviour performance in their work. This shows a proactive attitude toward personal and professional development, as they use feedback to improve and remain focused on achieving organisational objectives. According to Varshney & Varshney (2024), the findings suggest that employees in the study area demonstrate a strong sense of accountability, adaptability, and goal orientation, attributes that are crucial for fostering efficiency, continuous growth, and enhanced job performance. Further categorisation of employees' job performance was done to determine the level of job performance in the study area. As indicated in Fig 1 below, most of the employees (96.9%) showed a high level of performance at work.

Table 4: Level of Job Performance in the Study Area (n=157)

Statements	M	S. D
I was able to set priorities	4.50	0.51
I accept and learn from feedback	4.48	0.51
I kept in mind the work result I needed to achieve	4.41	0.59
I cooperate with others	4.31	0.46
I communicate effectively and I adequately express new ideas and intentions	4.31	0.56
I was able to plan my work so that I finished on time	4.29	0.84
I came up with creative solutions for new problems	4.27	0.6
I adjust work goals when necessary	4.06	0.7

Source: Field Survey, 2023; Note: M= Mean, SD= Standard Deviation

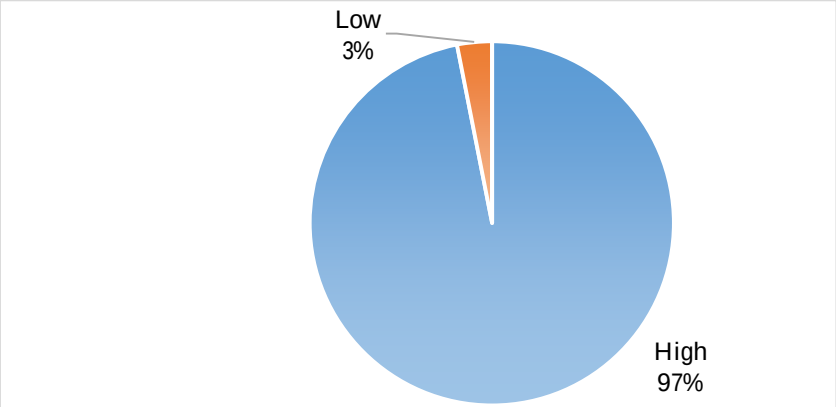

Fig 1: Level of job performance

Factors affecting employees' job performance in the study area

From the study, the results showed that availability of promotion opportunities ($\bar{x}$ = 3.85), clear definition of roles of workers in the organisation ($\bar{x}$ = 3.82), and good work environment ($\bar{x}$ = 3.71) were the major factors that are affecting employees' job performance. This result implies that employees' job performance in the study area is largely influenced by promotion opportunities, role clarity, and the work environment. The results suggest that providing clear career progression paths, defining roles explicitly, and maintaining a healthy work environment are key strategies for improving employee performance in the study area. This aligns with Herzberg's two-factor theory (1959), which emphasizes advancement and recognition as key motivators of employee performance (Wadood, 2023).

Table 5: Factors affecting employees' job performance in the study area (n=157)

Statements	M	S.D.
Availability of promotion opportunities	3.85	0.79
Clear definition of roles of workers in the organisation	3.82	0.99
Good work environment	3.71	1.02
There is availability of adequate training and development	3.55	1.09
Availability of adequate monetary compensation	3.12	1.07

Source: Field Survey, 2023; Note: M= Mean, SD= Standard Deviation

Test of association between the socio-economic characteristics of the employees and their job performance

Chi-square test was conducted on employees' socioeconomic characteristics and job performance at 0.05 significance level. The result as indicated in Table 6 revealed that only level of education (χ^2 = 96.00, p<0.05) and rank (χ^2 = 26.63, p<0.05) are significantly associated to employees' job performance. This suggests that employees with higher educational qualifications are likely to possess better knowledge, skills, and competencies, which enhance their efficiency and effectiveness at work. Likewise, higher-ranked employees may have more experience, authority, and access to organisational resources, which contribute positively to their performance levels. This finding aligns with the view of Sahoo *et al*., (2025), who noted that education and rank often determine employees' productivity, decision-making capacity, and overall contribution to organisational success. The result of the PPMC in Table 8 showed that age (r = 0.32, p<0.05) is significantly related to job performance. This indicates that as employees' age increases, their job performance tends to improve. This may be because older employees often possess greater experience, maturity, and problem-solving skills, which enhance their effectiveness and efficiency at work. Jiang *et al*., (2024) observed that job performance often improves with age because older workers develop stronger work habits, organisational commitment, and professional expertise over time.

Table 7: Test for Association between socioeconomic characteristics of respondents and level of employees' job performance

Variables	Chi square (χ^2)	Degree of Freedom	p-value	Decision
Level of education	96.00	5	0.00	S
Rank	24.63	1	0.00	S

Source: Field survey, 2023. NS: Not Significant; S: Significant

Table 8: Test for relationship between socioeconomic characteristics of respondents and level of employees' job performance

Variables	Correlation (r) Value	p-value	Decision
Age	0.32	0.00	S

Source: Field Survey, 2023; S: Significant

Relationship between conflict handling behaviour techniques and job performance in the study area.

The result in Table 9 indicated that conflict handling behaviour had a positive and significant relationship with level of employees' job performance at ($r = 0.34$, $p<0.05$). This suggests that as employees adopt more effective conflict-handling strategies, their job performance tends to improve. This means that workers who manage disagreements constructively, through communication, compromise, and collaboration, are more likely to maintain harmony, focus, and productivity in the workplace. This finding is consistent with the assertion of Suherman (2025), who emphasised that constructive conflict-handling behaviours enhance teamwork, reduce stress, and promote a more supportive work environment, all of which led to improved employee performance.

Table 9: Test for relationship between conflict handling behaviour and level of employees' job performance

Variables	r-value	p-value	Decision
Conflict Handling Behaviour and Level of Employees Job Performance	0.34	0.00	S

Source: Field Survey, 2023; S= significant

CONCLUSION AND RECOMMENDATIONS

The study concluded that there the major cause of conflicts in the study area is that unreasonable amount of work is given.

In addition, the study concluded that employees of the institution have high level of performances at their job. Also, the study concluded that the more employees adopt the conflict handling techniques, the better they perform at their jobs in the institution.

The following are recommended:

1. To reduce excessive workload, management should employ more personnels.
2. Periodic workshops and seminars on effective communication, emotional intelligence, and conflict resolution should be organised.
3. Management can also introduce job rotation or task-sharing systems to prevent burnout and promote efficiency.
4. To sustain and enhance performance, outstanding employees should be recognised through incentives such as performance bonuses, certificates, or promotions.

REFERENCES

Addison, J., and Teixeira, P. (2021). Worker Commitment and Establishment Performance. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3830214.

Adeogun S.O., Abiona B.G., Alabi O.S., and Yila J. (2018). Perceived Effect of Coaching and Mentoring on Employee Job Performance among Academic Staff in University of Ibadan, Oyo State, Nigeria. Journal of Humanities, Social Sciences and Creative Arts 2018, 13:98–110

Anand, S., & Mitra, A. (2021). *No family left behind: Flexibility i-deals for employees with stigmatized family identities* (Original work published 2022). *Human Relations, 75*(5), 956–988. https://doi.org/10.1177/0018726721999708

Daskalopoulou, C., Chua, K., Koukounari, A., Caballero, F., Caballero, F., Prince, M., and Prina, A. (2019). Development of a healthy ageing index in Latin American countries - a 10/66 dementia research group population-based study. BMC Medical Research Methodology, 19. https://doi.org/10.1186/s12874-019-0849-y.

David, J. T. (2025). Representation, performative exchange and Afropolitanism: Rethinking opera production in Nigeria through *The Magic Flute*. *Cambridge Opera Journal*, *37*(1), 27–52.

https://doi.org/10.1017/S0954586725100505

Jiang, C., Zhou, L., & Jiang, S. (2024). From spiritual climate to social workers' job performance: A serial mediation model of organisational commitment and work engagement. *The British Journal of Social Work*, *54*. https://doi.org/10.1093/bjsw/bcae095

Kolb, D. M., & Bartunek, J. M. (2017). Hidden conflict in organisations. Journal of Organisational Behaviour, 38(4), 563-576.)

Lestari, S., Watini, S., & Rose, D. E. (2024). Impact of self-efficacy and work discipline on employee performance in sociopreneur initiatives. *Aptisi Transactions on Technopreneurship (ATT)*, 6(2), 270–284. https://doi.org/10.34306/att.v6i2.403

Maharani, R., & Haeba Ramli, A. (2024). The roles of family-supportive supervisor behaviour, work-life balance, job satisfaction, motivation, and job performance among married private employees. *Journal of Human Resource Management - HR Advances and Developments*, 2024, 39–54. https://doi.org/10.46287/PKYK4429

Sahoo, A., Sood, S., Sohal, J., Goyal, N., Bawa, R., & Rajitha, R. (2025). Exploring the influence of organisational culture on employee performance and organisational success. *Multidisciplinary Science Journal*, *7*, 2025ss0211. https://doi.org/10.31893/multiscience.2025ss0211

Suherman, U. (2025). Paternalistic leadership and teamwork on employee performance at Sharia hotels: The mediating role of work-family conflict. *BISMA (Bisnis dan Manajemen)*, 17(2), 243–263. https://doi.org/10.26740/bisma.v17n2.p243-263

Varshney, D., & Varshney, N. K. (2024). Self-concept and job performance: The mediating role of resilience. *International Journal of Productivity and Performance Management*, *73*(5), 1563–1586. https://doi.org/10.1108/IJPPM-10-2022-0548

Wadood, S. (2023). The role of motivation in enhancing organisational performance and talent retention. *Apex Journal of Social Sciences*, *2*(2), 25–33. https://apexjss.com/index.php/AJSS/article/view/14

Wiche, H., Adeyeye, Y., Oladokun, B., Aderibigbe, N., Nduka, N., & Oloniruha, E. (2023). Librarians' preparedness towards robots' usage in Nigerian academic libraries. *Journal of Library and Information Science*, 6, 181–191.

Yusuf, I., & Abolade, A. (2025). Examining the role of conflict management strategies on employee retention: A conceptual approach. *Management and Entrepreneurship: Trends of Development*, *2*(32), 83–95. https://doi.org/10.26661/2522-1566/2025-2/32-06

ASSESSMENT OF ENVIRONMENTAL DEGRADATION AND DETERMINANTS OF ADAPTATION STRATEGIES AMONG ARABLE CROP FARMERS IN OYO STATE OF NIGERIA

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ABSTRACT
Declining land productivity is one of the environmental problems that is seriously impacting negatively on human wellbeing and the ecosystem of many parts of the world and agriculture. This study evaluates environmental degradation and determinants of adaptation strategies among arable crop farmers in Oyo State of Nigeria. Multistage sampling procedure was employed to select 109 farmers in the study area. Data collection was achieved with the use of structured questionnaire and interview schedule and analysed using descriptive statistics and multivariate probit. About 98%, 80% and 71% stated that environmental degradation includes land degradation, water degradation, and pollution respectively. The common strategies adopted by the farmers to cope with environmental degradation include the use of cover crops (92%), land reclamation (94.5), irrigation practices (86%), and the use of organic manure (89%). Age, education, experience in farming, farm size, income, and membership of association were the factors influencing the choice of adaptation measures. Policies and programme targeting at reducing environmental degradation and increasing resilience should consider farmers specific characteristics such as age, household size, farm size, educational qualification among others.
Keywords: Environment; Degradation; Adaptation Measures; Crop Farmers

INTRODUCTION

One of the most important sectors in the economy of a developing country is agriculture. In Nigeria, the agricultural sector constitutes more than one third of the Gross Domestic Product (GDP). It formed major part of non-oil products among the export products in the country, and the major food requirement of the population is provided through agricultural sector. (Kogo, 2021; Olabomi *et al.*, 2021). Considering the aforementioned, agricultural sector had huge positive impact on many households ensuring sustainable income and wealth creation (Mupeta *et al.*, 2020). Despite the positive impacts of this sector on the population, agriculture is still faced with several problems, one of which is environmental degradation.

Production of crops that mature and produce within a season or two seasons are regarded as arable crop farming. Examples of these crops include the following: yam, soybeans, rice, cassava, maize, cotton, cowpea and so on. (Ibidapo *et al*., 2018). Considering the life cycle of annual crops, its production is associated with a lot of risk. One of the risks is weather uncertainty and environmental degradation. (Kolapo *et al*, 2022).

Smallholder farmers in developing economies have been using various strategies to cope with and adapt land degradation problem. Some of the key strategies include agroforestry, cover cropping, conservation agriculture and integrated facility management. These sustainable practices have been reported to increase farmers' productivity (IPCC, 2019; Oyewole *et al*., 2022). Several studies have established the relationship between adaptation strategies and sociodemographic characteristics of the farmers (Haftu *et al*., 2019). This study assessed the types of environmental degradation in the study area, identified the common adaptation strategies and factors that are influencing the adaptation strategies adopted by the farmers in the quest to cope with the effect of environmental degradation.

METHODOLOGY

The study was conducted in Akinyele Local Government Area of Oyo State in Nigeria. The area is founded with geographic coordinate; Latitude 7.5309 N and 3.9110 E. The town has a tropical climate, and it is one of the major agricultural areas of Oyo state producing crops like cocoa, palm products, plantain, banana, cassava, yam, maize, citrus and various other cash crops are cultivated in the local government aside poultry and livestock production (World Meteorological Organization, 2005).

Multistage sampling procedure was used to select the respondents for the study. The first stage involves the purposive selection of 5 agrarian wards (Arulogun,Ojo- Emo, Olorisa-oko, Elekuru and Iroko) out of the twelve wards in Akinyele Local Government Area. The second stage, one village was selected from each ward (Arulogun (Eniosa), Ojo-Emo (Ajibode), Olorisa-oko (Olorisa-oko), Elekuru (Elekuru) and Iroko (Iroko)). Stage three involves selection of (5% of the farmers from the population in each village). Therefore, 109 farmers were selected for the study.

Primary data were collected using well-structured questionnaires and interview schedules. Data was analysed using descriptive statistics such as frequency count and percentages. The determinants of adaptation strategies to environmental degradation were analysed with the use of multivariate Probit model. This was used because the respondents are more likely to adopt a

mix of adaptation strategies to deal with a multitude of environmental degradation induced risks and constraints than adopting a single strategy.

RESULTS AND DISCUSSION

Types of environmental degradation

Table 1 above shows that there are several types of environmental degradation in the study area which has caused a serious problem for the farmers at the study area. The results revealed that soil or land degradation 98.2%is the most common environmental degradation in the study area followed by atmospheric degradation (87.2%), water degradation (80.7%) and pollution (71.6%). The result is in line with the findings of Ogunbode *et al*, 2021 who listed degradation of the soil or land, water degradation, atmospheric degradation and contamination (pollution) of the ecosystems and biodiversity loss as the major and most common types of environmental degradation.

Table 1: Types of environmental degradation in the study area

Variables	Frequency	Percentage
Soil or land degradation	107	92.8
Water degradation	88	80.7
Atmospheric degradation	95	87.2
Pollution	78	71.6

Source: Field survey, 2023, * Multiple responses were allowed

Adaptation strategies used by the farmers

The farmers used different environmental degradation adaptation strategies to curb the different effects of environmental degradation on arable crop production in the area (Table 1). Management of irrigation (86.2 %), Land reclamation (94.5%), Use of organic manure (89.9 %) and Crop rotation (94.5%) respectively. It further revealed, planting of cover crops (92.7%). Others include Afforestation practices (11.9%), Agroforestry practices (11.9 %) and lastly Managing quarry and mining activities (15.6 %). The result implies that farmers combined different environmental degradation adaptation strategies to guide against its effects on arable crop production in the area. The variation in the type of strategies used may be due to differences in the access to capital, information on the use of different environmental degradation adaptation strategies and type of arable crop grown by the individual farmers. This implies that crop farmers use different environmental degradation adaptation strategies in the area. The adaptation strategies identified in this study is similar to the study of Tefera *et al* 2024, which affirmed that important adaptation options in the agricultural sector include agroforestry practices, conservation agriculture (such as zero tillage, crop rotation, mixed cropping, mulching etc), organic farming and water harvesting technologies**.**

Table 2: Adaptation strategies to the effect of environmental degradation on arable crop production

Variables	Frequency	Percentage (%)
Afforestation practices	96	88.1
Agroforestry practices	13	11.9
Management of irrigation	94	86.2
Land reclamation	103	94.5
Use of organic manure	98	89.9
Planting of cover crops	101	92.7
Crop rotation	103	94.5
Zero tillage	45	41.3
Managing quarry and mining activities	17	15.6

Source: Field survey, 2023, Multiple responses

Factors influencing the adaptive strategies adopted by the respondents

The results of the multivariate probit model in Table 3 revealed that the age of the farmers was significantly negative at 10% probability level related to diversification to Farming activities, and the use of irrigation practices. This implies that the probability of adaptation significantly decreases the older a farmer is. The similar outcome was found and explained by Uddin *et al.* (2014). However, age of the farmers turned out to be negatively associated with the adoption of the use of irrigation as adaptation strategy, which suggests that younger farmers are more likely to adopt compared to their older counterparts possibly for being innovative and keen to try new technology and methods to improve agriculture (Jack *et al.*, 2022). Age also affects the use of land reclamation as an adaptation strategy. Education had a positive relationship with the use of irrigation and land reclamation strategy. This suggests the probability of using irrigation and land reclamation increased with respondents' level of

education. The coefficient of gender of the respondent was negatively and significantly ($p<0.05$) related to agroforestry practices. This indicates that there is likelihood of higher agroforestry adoption among women compared to men. Income of the respondents exerts a negative and significant influence on the use of irrigation practices and land reclamation strategy. This suggests that the probability of adopting irrigation practices and land reclamation would reduce with increase in income. Borku *et al*., 2024 argued that higher household income significantly affects the choice of Livelihood diversification activities either on-farm + non-farm or non-farm + off-farm activities, or a combination of activities.

Table 3: Factors influencing the adaptive strategies adopted by the respondents

Variables	Management of irrigation practices	Use of land reclamation	Agroforestry practices	Zero tillage
Age	-0.1548	-0.7651**	0.3951***	-0.2716**
	(0.2719)	(0.3306)	(0.1484)	(0.1158)
Education	-1.2450**	1.7106***	-0.319	0.0134
	(0.4830)	(0.6392)	(0.2343)	(0.1747)
Gender	0.7866	-0.1007	-0.9803***	-0.1310
	(0.6091)	(0.6269)	(0.3772)	(0.2707)
Years of experience	0.9032**	-0.6332**	-0.1184	0.1294
	(0.37330	(0.3002)	(0.1731)	(0.1327)
Farm size	-0.0905	0.2642	0.9440**	0.2977
	(0.7611)	(0.9711)	(0.3747)	(0.2622)
Income	-1.7783***	-0.7901**	-0.2176	0.1440
	(0.4844)	(0.3891)	(0.1978)	(0.1687)
Membership of cooperatives	0.2445**	0.5038	-0.6056**	0.6486***
	(0.4863)	(0.4656)	(0.3079)	(0.2436)

Source: Field survey, 2023. **= significant at 5%: ***= significant at 1% Figures in parentheses are standard error

CONCLUSION AND RECOMMENDATIONS

The study revealed that land degradation is the most common type of environmental degradation, followed by atmospheric degradation, water degradation and pollution. The respondents made use combinations of adaptation strategies such as use of land reclamation, planting of cover crops, Use of organic matter and management of irrigation practices among other strategies to cope with environmental degradation. The study also revealed that age, education, years of farming experience, income and membership of cooperatives were the determinants of adaptation strategies. This study therefore recommends that afforestation programmes should be encouraged among farmers and integration of local stakeholders in environmental resource management programmes to ensure sustainability of available resources.

REFERENCES

Borku, A.W., Utallo, A. U. and Tora, T. T. (2024). Determinants of urban households in the diversification of livelihood activities: The case of Wolaita zone in southern Ethiopia, Journal of Agriculture and Food Research, 16. 101193, ISSN 2666-1543, https://doi.org/10.1016/j.jafr.2024.101193.

Haftu, E., Teklay, N., Metkel, A., 2019. Factors that influence the implementation of sustainable land management practices by rural households in Tigrai region, Ethiopia. Ecol. Process. 8, 14. http://dx.doi.org/10.1186/s13717-019-0166-8.

Ibidapo, I., Ogunshipe M.H., Oso, O.P. and Akintade, T. F. (2018). Assessment of arable crop farmers' perception and adaptation to climate change in ondo state, Nigeria. Greener journal of agricultural science, 8(5), 100-109.

IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Jack C, Hotchkiss E, Sargison ND, Toma L, Milne C, Bartley DJ (2022) Determining the influence of socio-psychological factors on the adoption of individual 'best practice' parasite control behaviours from Scottish sheep farmers. Prev Vet Med 200:105594

Kogo, B.K., Kumar, L. and Koech, R. (2021), "Climate change and variability in Kenya: a review of impacts on agriculture and food security", Environment, Development and Sustainability, Vol. 23 No. 1, pp. 23-43

Kolapo, A., Didunyemib, A. J., Aniyic, O. J. and Obembe, O. E. (2022). Adoption of multiple sustainable land management

practices and its effects on productivity of smallholder maize farmers in Nigeria. Resources, Environment and Sustainability 10

Ogunbode, T., Omotayo, O., Asifat, J., Ogunbile, P., Olatubi, I., & Oyebamiji, V. (2021). Challenges of degradation in the Tropical Environment: Causes, Footprints and Remedies. Aswan University Journal of Environmental Studies, https://doi.org/10.21608/aujes.2021.89948.1035

Olabomi, R. A., Ogundola, J., Yakubu, A. M., Abimbola G. B., Adetoro,V. A. and Nwubani, O. W. (2021). Sustainable Agricultural Infrastructure and Development of Rural Economy in Nigeria. Socio Economy and Policy Studies (SEPS) 1(2); 56-62. DOI: http://doi.org/10.26480/seps.02.2021.56.62

Oyewole, S. O., Aderounmu A. F., Adepoju, A. O. and Oyewole, A. L. (2022). Climate change and agricultural production trends in Nigeria: Implication for sustainable food production. *Journal of Meteorology and Climate Science*, 21(1): 1-14 (Journal of Meteorological Society of Nigeria). Published by African Journals Online.

Tefera, M. L., Carletti, A., Altea, L., Rizzu, M., Migheli, Q. and Seddaiu, G. (2024). Land degradation and the upper hand of sustainable agricultural intensification in sub-Saharan Africa- A systematic review Journal of Agriculture and Rural Development in the Tropics and Subtropics. 125 (1), 63–83. https://doi.org/10.17170/kobra-

WMO (2005) Climate and land degradation. World Meteorol Organ, WMO No. 987.

UTILISATION OF IRRIGATION TECHNOLOGIES AMONG VEGETABLE FARMERS IN OYO STATE, NIGERIA

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ABSTRACT

Irrigation technology plays an important role in sustainable vegetable production, especially in regions with irregular rainfall patterns. This study assessed the benefits of vegetable farmers derived from irrigation technologies. A multistage sampling procedure was used to select 150 vegetable farmers, and data were collected using a structured questionnaire. Descriptive and inferential statistics were used for data analysis. Vegetable farmers were aged 38±12 years, male (75.3%), mostly married (50.7%), and educated up to secondary level (75.3%). Farming was the main occupation (80.7%), with an average farming experience of 12±8 years, while 66.7% engaged in trading as a secondary occupation. Most respondents (80.7%) were members of cooperative societies, but 67.3% lacked access to extension services. Drip irrigation was the most available irrigation technology (95.3%). Significant relationships were found between marital status (χ^2=13.468, p=0.004), education level (χ^2=15.713, p=0.026), cooperative membership (χ^2=11.513, p=0.016), income (r=0.144, p=0.040), years of experience (r=0.275, p=0.013) on the benefits of irrigation technology. It is concluded that drip irrigation is the predominant irrigation technology benefitted by the vegetable farmers. The study recommends that government and agricultural development agencies should subsidize drip irrigation equipment and strengthen extension services through cooperative societies to reduce costs and enhance farmers' capacity and adoption of irrigation technologies.

Keywords: Irrigation technology, Vegetable farmers, Benefits, Oyo State, Nigeria.

INTRODUCTION

Agricultural production in Nigeria remains largely rain-fed and highly vulnerable to climate variability, resulting in unstable crop yields and income uncertainty for farmers. Irrigation has therefore become essential for enhancing agricultural productivity, particularly in vegetable farming, which requires reliable water supply. Globally, irrigated agriculture contributes disproportionately to food production despite occupying a smaller share of cultivated land. In Nigeria, however, irrigation adoption remains low, limiting dry-season farming and intensification.

Vegetable farming offers high economic returns on small landholdings and contributes significantly to household food security and income generation. The use of irrigation technologies can further enhance these benefits by enabling year-round production. Despite government investments through River Basin Development Authorities, smallholder farmers face challenges such as high equipment costs, limited technical support, and inadequate access to extension services. This study therefore examined the benefits derived from irrigation technologies among vegetable farmers in Oyo State, focusing on socio-economic characteristics and available irrigation technologies

METHODOLOGY

The study was conducted in Oyo State, southwestern Nigeria. Three Local Government Areas Akinyele, Egbeda, and Ona Ara were purposively selected due to their prominence in vegetable production and irrigation practices. Fifteen villages were selected across the LGAs, and ten vegetable farmers per village were purposively sampled, giving a total of 150 respondents. Data were collected using a structured questionnaire covering socio-economic characteristics, irrigation technologies, benefits, and constraints. Descriptive statistics summarized the data, while chi-square and Pearson Product Moment Correlation analyses tested relationships between socio-economic variables and benefits derived from irrigation technology.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The socio-economic characteristics of the vegetable farmers in Table 4.1 revealed that the majority (58.0%) were within the youthful and economically active age range of 18–41 years, with a mean age of 38 ± 12 years, implying that farmers at this age bracket tend to be more eager and innovative in nature which could enhance their likelihood of using innovative technologies such as irrigation. This is in line with the findings of Akudugu, Nkegbe, Wongnaa and Millar (2023) that reported age influencing the use of irrigation technology. The results indicate that access to irrigation technology is the most influential factor determining its use among farmers, underscoring the importance of availability and physical access in shaping adoption decisions. Most of the vegetable farmers (75.3%) were males, suggesting that vegetable farming is male dominated, though women still play significant roles in related activities. In terms of marital status as indicated in Figure 1, 50.7% were married, indicating family responsibilities that may drive technology adoption for improved productivity and household welfare. Education played an important role, as 75.3% of

respondents had at least secondary education as presented in Figure 2, which enhances their ability to understand and adopt modern agricultural practices. Household size was relatively large, with an average of 7±5 persons, providing family labour that could support labour-intensive farming activities. Farming was the primary occupation for 80.7% of respondents, with an average of 12±8 years of farming experience, reflecting their knowledge of production and readiness to evaluate new technologies. While 66.7% engaged in trading as their secondary occupation, 80.7% were members of cooperative societies, which provided access to resources, information, and support networks. However, 67.3% lacked access to extension services, potentially limiting their exposure to improved practices. Income distribution showed that 36.7% earned ₦20,000–₦40,000 monthly, with a mean of ₦35,000±20,000, suggesting moderate financial capacity to invest in irrigation technologies.

Table 4.1: Socioeconomic characteristics of the respondents

Variables	Frequency	Percentage	Mean	SD
Age (Years)				
18-29	30	20.0		
30-41	57	38.0	38	12
42-53	43	28.7		
54-65	20	13.3		
Sex				
Male	113	75.3		
Female	37	24.7		
Size of household				
Less than 5	37	24.7		
5-10	102	68.0	7	5
11-15	6	4.0		
16-20	1	0.7		
Above 20	4	2.7		
Main occupation				
Farming	121	80.7		
Trading	24	16.0		
Formal employment	5	3.3		
Farming experience (Years)				
1-8	32	21.3		
9-16	96	64.0	12	8
17-24	22	14.7		
Secondary occupation				
Faming	15	10.0		
Trading	100	66.7		
Artisan	35	23.3		
Member of cooperative society				
Yes	121	80.7		
No	29	19.3		
Access to extension services				
Yes	49	32.7		
No	101	67.3		
Monthly income (N)				
Less than 20,000	18	12.0		
20,000-40,000	55	36.7	35,000	20,000
40,001-60,000	17	11.3		
60,001-80,000	14	9.3		
Above 80,000	46	30.7		
Type of crop planted				
Vegetables	102	68.0		
Maize	37	24.7		
Cassava	6	4.0		
Yam	1	0.7		
Soybean	4	2.7		

Source: Field survey, 2024

The dominant crop was vegetables (68.0%), followed by maize (24.7%) and few others, showing a strong focus on high-value crops with short production cycles for quick returns, while crop diversification served as a risk management strategy. These socio-economic features collectively highlight a population that is youthful, moderately educated, largely male, and cooperative-driven, with both opportunities and constraints in adopting modern farming technologies.

Figure 4.1: Distribution of respondents' marital status

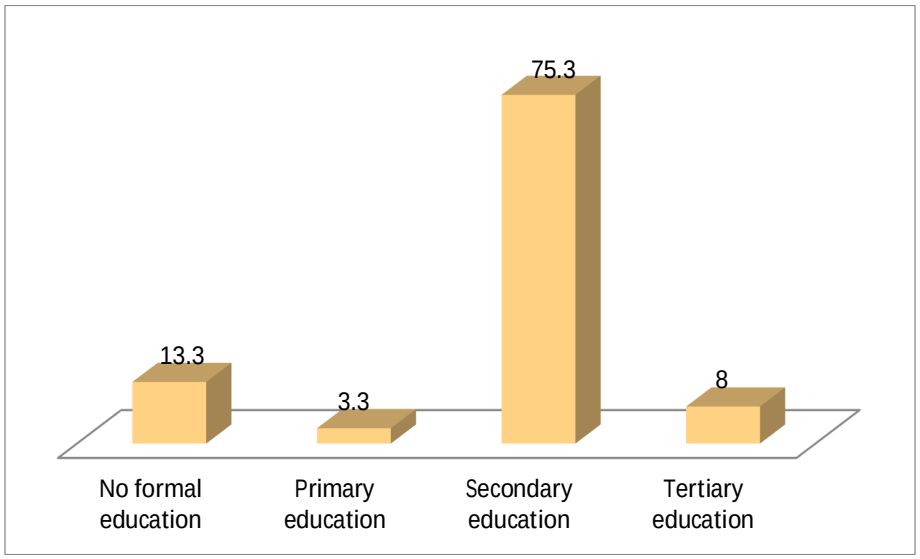

Figure 4.2: Distribution of respondents' educational status

Available forms of irrigation technologies

The presentation of different forms of utilization of irrigation technology that is available to the vegetable farmers in Table 4.2 shows that drip irrigation (95.3%) was more available to the vegetable farmers in the study area. This may be because drip irrigation systems are known for their high water use efficiency, as they deliver water directly to the plant roots, minimizing evaporation and runoff. This is particularly beneficial in areas facing water scarcity, helping to conserve valuable water resources and with precise water delivery, crops receive the optimal amount of moisture required for growth, potentially leading to higher yields. This can improve food security and increase farmers' incomes. This study aligns with Ogbodo et al. (2021) who posited that vegetable farmers significantly adopted improved drip irrigation

technology. The availability of drip irrigation was followed by surface irrigation (59.3%) and manual irrigation (57.3%). However, subsurface irrigation (14.0%) and sprinkler irrigation (10.7%) are least available to the respondents in the study area. The low availability suggests there might be significant barriers to the adoption of subsurface and sprinkler irrigation.

Table 4.2: Different forms of irrigation technologies available

Available of irrigation technology	Yes	No
Drip irrigation	143 (95.3)	7 (4.7)
Furrow irrigation	28 (18.7)	122 (81.3)
Manual irrigation	86 (57.3)	64 (42.7)
Sprinkler irrigation	16 (10.7)	134 (89.3)
Subsurface irrigation	21 (14.0)	129 (86.0)
Surface irrigation	89 (59.3)	61 (40.7)

Source: Field survey, 2024

Benefits of irrigation technologies

The result of benefits of irrigation technologies in Table 4.3 shows that the foremost benefit was the sustainability of job opportunity which ranked 1st with a mean value of 1.77. The high mean score indicates that irrigation technology plays a crucial role in maintaining job security for farmers. By ensuring reliable water supply for crops, farmers can avoid the risks associated with droughts and irregular rainfall, leading to more stable income and job retention and reliable irrigation allows for consistent crop production, which can lead to increased agricultural output and productivity. This stability encourages farmers to continue farming, thereby sustaining their livelihoods and reducing the likelihood of job loss. This is in line with the findings of Abidogun et al. (2019) that technologies assisted farmers to sustain their production all year round. Increased sustainability of job was followed by increase in farmers' profit ($\bar{x}$ =1.70) ranked 2nd, making vegetable available all year round ($\bar{x}$ =1.65) ranked 3rd, food security ($\bar{x}$ =1.63) ranked 4th and increased food production ($\bar{x}$ =1.58) and ranked 5th. However, least benefits were reduced indebtedness ($\bar{x}$ =1.22) ranked 13th, food diversification ($\bar{x}$ =1.20) ranked 14th and attract consumers ($\bar{x}$ =0.98) ranked 15th. The lower rankings for reduced indebtedness, food diversification, and attracting consumers highlight areas where the benefits of irrigation technology are not being fully realized by respondents.

Table 4.3: Benefits of irrigation technologies

Benefits	Highly beneficial	Beneficial	Not beneficial	Mean	Rank
Job opportunity	124 (82.7)	18 (12.0)	8 (5.3)	1.77	1st
Income increment	89 (59.3)	36 (24.0)	25 (16.7)	1.42	11th
Low food prices	94 (62.7)	34 (22.7)	22 (14.7)	1.48	10th
Increase food production	104 (69.3)	30 (20.0)	16 (10.7)	1.58	5th
Food diversification	65 (43.3)	51 (34.0)	34 (22.7)	1.20	14th
Food security	110 (73.3)	25 (16.7)	15 (10.0)	1.63	4th
Improve water supply	100 (66.7)	33 (22.0)	17 (11.3)	1.55	7th
Stability of food supply	99 (66.0)	32 (21.3)	19 (12.7)	1.53	8th
Increase food quality	95 (63.3)	36 (24.0)	19 (12.7)	1.50	9th
Increases freshness of vegetables	84 (56.0)	37 (24.7)	29 (19.3)	1.36	12th
Reduce indebtedness	72 (48.0)	39 (26.0)	39 (26.0)	1.22	13th
Increases farmers profit	120 (80.0)	15 (10.0)	15 (10.0)	1.70	2nd
Improve farmers livelihood	103 (68.7)	28 (18.7)	19 (12.7)	1.56	6th
Make vegetable all year around	113 (75.3)	22 (14.7)	15 (10.0)	1.65	3rd
Attract consumes	50 (33.3)	47 (31.3)	53 (35.3)	0.98	15th

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATION

The study concludes that irrigation technology, particularly drip irrigation, plays a vital role in enhancing vegetable farmers' productivity, income stability and livelihood sustainability in Oyo State. Vegetable farmers demonstrated high benefits from irrigation. It is recommended that government and agricultural development agencies subsidize irrigation equipment and strengthen extension service delivery through cooperative societies to improve farmers' access, technical capacity, and sustained benefits from irrigation technologies.

REFERENCES

Adebisi-Adelani, O., et al. (2011). Analysis of production constraints facing Fadama vegetable farmers in Oyo State, Nigeria. *World Journal of Agricultural Sciences*, 7(2), 189–192.

Akudugu, M. A. et al. (2023). Technology adoption behaviours of farmers during crises. *Journal of Agriculture and Food Research*, 14, 100694.

Bamire, A. S., & Oke, J. T. O. (2004). Profitability of vegetable farming in Southwestern Nigeria. *Journal of Vegetable Crop Production*, 9(2), 11–18.

FAO. (2018). *Smallholder irrigation and water management for sustainable agriculture*. Rome.

Ogbodo, I. H., et al. (2021). Determinants of adoption of improved agricultural technologies among farmers in Nigeria.

PERCEIVED EFFECTS OF AGRICULTURAL COOPERATIVES ON SMALL FARM HOLDINGS AMONG ARABLE CROP FARMERS IN IDO LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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ABSTRACT

Agricultural cooperatives play a critical role in supporting smallholder farmers by enhancing access to resources, markets, and collective action. This study assessed the perceived effect of agricultural cooperatives on smallholder arable crop farmers in Ido Local Government Area, Oyo State, Nigeria. Using a multistage sampling technique, 150 respondents were selected, and data were collected via structured questionnaires. Descriptive and inferential statistics were used for analysis. Results showed that respondents were predominantly male (67.3%), with a mean age of 43±10 years and mean household size of 7±5. Most were married (82.7%), educated (92.7%), and engaged in trading as a secondary occupation (40.7%). Cooperative membership (82.7%) and access to credit (84.7%) were high, but access to extension services was limited (87.3%). Participation in joint marketing and sales was highest (90%), and 70% of respondents perceived a strong positive effect of cooperatives on their farming. Major constraints included anxiety, untimely loan disbursement, and lack of collateral. Socio-economic characteristics such as marital status, education, cooperative membership, age, and household size significantly influenced perceived cooperative effects. The study concludes that cooperatives positively impact smallholder arable crop farming, primarily through credit access and collective marketing. Recommendations include strengthening extension services, capacity building, and government support to enhance cooperative benefits.

Keywords: Agricultural cooperatives, perceived effects, smallholder farmers, arable crops, Nigeria

INTRODUCTION

Agriculture remains central to Nigeria's economy, contributing 31% to GDP and providing employment for over 67% of the workforce (World Bank, 2014). Despite its importance, smallholder farmers dominate the sector, often facing challenges such as poor access to credit, markets, modern inputs, and extension services (Davis, 2020; Oluwatayo et al., 2020). Cooperatives provide a mechanism to pool resources, access credit, reduce transaction costs, and improve market power (Birchall & Simmons, 2019; Yamusa & Adefila, 2014). Despite these benefits, smallholder farmers in Nigeria continue to face barriers such as high input costs, poor infrastructure, and inadequate access to credit. The removal of subsidies on fertilizers and other inputs has further compounded their challenges. Consequently, cooperatives remain one of the most viable options for mobilizing farmers, pooling resources, and improving productivity. This study, therefore, seeks to examine the perceived effects of agricultural cooperatives on smallholder arable crop farmers in Ido Local Government Area of Oyo State. Specifically, it aims to describe the socio-economic characteristics of farmers, assess their participation in cooperative activities, determine the perceived effects of such activities on small farm holdings, and identify the constraints hindering their full engagement. Hypotheses tested were: There is no significant relationship between socioeconomic characteristics of the respondents and the perceived effect of the agricultural cooperative activities; and there is no significant relationship between constraints to participation in agricultural cooperative activities and perceived effect of the agricultural cooperative activities.

The objectives of the study are to:

1. Describe socio-economic characteristics of smallholder farmers.
2. Assess participation in cooperative activities.
3. Determine perceived effects of cooperatives on small farm holdings.
4. Identify constraints to participation.
5. Test hypotheses on relationships between socio-economic characteristics, constraints, and perceived cooperative effects.

METHODOLOGY

The study was conducted in Ido LGA, Oyo State, covering 986 km² with 103,261 residents (2006 census). Five wards were randomly selected, two villages per ward, and fifteen farmers per village, giving a total of 150 respondents. Data were collected via structured questionnaires covering socio-economic profiles, cooperative participation, perceived effects, and constraints. Responses on perceived effects were measured on a five-point Likert scale (SA, A, U, D and SD with scoring of 5, 4, 3, 2 and 1). Data were analysed using descriptive statistics, chi-square tests, and Pearson correlation.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Most respondents were male (67.3%), aged 30–49 years (52%), married (82.7%), with household sizes of 5–10 persons (60.7%). Education levels were moderate, with 46% having primary education. Secondary occupations included trading (40.7%). Cooperative membership was high (82.7%), and most had access to credit (84.7%), though extension

services were largely unavailable (87.3%). Land tenure was mainly rented (48.7%), with 56.7% relying on hired labour. These factors influence both participation in cooperative groups and perceived benefits.

Cooperative activities and participation

Respondents mostly participated in joint marketing and sales (90%), followed by bulk input purchase (83.3%) and training (82.7%). Least participation was in transportation (56%). Participation frequency data showed that joint marketing had the highest mean score (1.62), reflecting the economic importance of collective bargaining. On the overall, 65.3% had high participation levels, supporting better financial outcomes and market access.

Perceived effects of cooperatives

Seventy percent of respondents perceived cooperatives as highly effective in enhancing their farming operations, especially in marketing, bulking, and access to credit. Challenges like climate variability affected sales, but cooperatives provided market awareness and facilitated sales. These findings align with Hirsch et al. (2020), highlighting cooperatives' role in stabilising smallholder incomes.

Constraints to participation

Major constraints included anxiety (mean = 1.48), untimely loan disbursement (1.34), lack of collateral (1.33), and harsh loan recovery measures (1.33). Minor constraints were fear of swindling (1.19) and time involvement for meetings (1.16). High anxiety levels may reduce full engagement, limiting access to cooperative benefits.

The hypotheses tested are:

1. Socioeconomic characteristics vs perceived effect: Significant relationships were found for marital status, education, and cooperative membership, while sex and access to credit were not significant. Pearson correlation indicated age ($r=0.357$, $p<0.01$) and household size ($r=0.205$, $p<0.05$) positively influenced perceived effect.
2. Constraints vs perceived effect: Constraints negatively correlated with perceived effects ($r=-0.205$, $p<0.05$), indicating that barriers reduce the benefits perceived by farmers.

CONCLUSION AND RECOMMENDATIONS

The study concludes that smallholder farmers perceive agricultural cooperatives positively, particularly in credit access and joint marketing. Socio-economic characteristics, cooperative membership, and household size shape these perceptions, while constraints such as anxiety and loan challenges limit full participation.

The following are recommended

1. Integrate extension services into cooperatives to enhance technical knowledge and productivity.
2. Implement training programs to address anxiety and improve cooperative engagement.
3. Government support through infrastructure, favourable policies, and subsidies to strengthen cooperative effectiveness.
4. Encourage bulk input purchases, shared machinery, and joint marketing to maximise cooperative benefits.

REFERENCES

Abebaw, D., & Haile, M. G. (2013). The impact of cooperatives on agricultural technology adoption: Evidence from Ethiopia. *Food Policy, 38*, 82–91.

Birchall, J., & Simmons, R. (2019). *Co-operatives and poverty reduction: Evidence from Sri Lanka and Tanzania.* Manchester: Co-op College.

Davis, R. S. (2020). Conditional pre-emption, commandeering, and the values of cooperative federalism: An analysis of Section 216 of EPAct. *Columbia Law Review, 404–451.*

Hirsch, S., Mishra, A., Möhring, N., & Finger, R. (2020). Revisiting firm flexibility and efficiency: Evidence from the EU dairy processing industry. *European Review of Agricultural Economics, 47*(3), 971–1008.

Oluwatayo, A. B., Sekumade, S., & Adesoji, S. A. (2008). Resource use efficiency of maize farmers in rural Nigeria: Evidence from Ekiti State. *World Journal of Agricultural Science, 4*(1), 91–99.

Toluwase, S. O. W., & Apata, O. M. (2013). Impact of farmers' cooperatives on agricultural productivity in Ekiti State, Nigeria. *Greener Journal of Agricultural Sciences, 3*(1), 63–67.

Yamusa, I., & Adefila, J. O. (2014). Farmers' cooperatives and agricultural development in Kwali Area Council, Abuja. *International Journal of Humanities and Social Science, 4*(7), 1–12.

World Bank. (2014). *World Development Report.* Washington, DC: World Bank.