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PERCEIVED EFFECTS OF AGRICULTURAL EXTENSION SERVICES ON LIVELIHOOD OF ARABLE CROP FARMERS IN ONA ARA LOCAL GOVERNMENT AREA OF OYO STATE

[1]Adediji, Daniel B, [2]Nwali, Collins S, [2]Ikuejawa, Ishmeal I., [3]Amuwa, Victor Onuorah, [2]Oluwafemi, Oluyemi H. and [4]Nwali Eunice Nnedimma

[1]Department of Agricultural Extension and Management, Federal College of Agriculture, Ibadan Oyo State Nigeria

[2]Department of Agribusiness Management, Federal College of Agriculture, Ibadan Oyo State Nigeria

[3]Department of Agricultural Economics, Dennis Osadebay University Asaba, Delta State Nigeria

[4]Department of Food Technology, Federal College of Agriculture, Ibadan Oyo State Nigeria

Corresponding Author's email: sunccollins@yahoo.com

ABSTRACT

Agricultural extension services serve as a vital bridge between research institutions and farmers by disseminating relevant information, introducing improved technologies, and providing technical support to enhance farming practices. Assessing the effect of these services is essential for determining their effectiveness in increasing farmers' income and improving their overall livelihoods, including food security, health, and social well-being. This study was conducted to assess the perceived effects of agricultural extension services on the livelihood of arable crop farmers in Ona Ara Local Government Area of Oyo State, Nigeria. Multi-stage sampling technique was employed to select 120 arable crop farmers. Primary data were collected using structured questionnaires and analysed using descriptive statistics, chi-square, and Pearson Product Moment Correlation (PPMC). Results revealed that the majority of respondents were male (67.5%), aged above 51 years (46.7%), married (6 6.7%), and had attained secondary education (57.5%). Most operated farms between 6–10 hectares (41.7%) and were members of cooperatives (71.7%) and farmers' associations (60.0%). Among the extension services, advisory services were the most widely accessed (79.2%), followed by nutrition education (50.0%) and livestock extension services (47.5%). Farmers perceived agricultural extension services as significantly improving their productivity and encouraging crop diversification, thereby enhancing food security. Key challenges to effective service delivery includes: limited access to technology (mean = 2.45) and weak collaboration with research institutions (mean = 2.40). Chi-square analysis indicated that sex, marital status, cooperative membership, and sources of credit were significantly associated with the perceived effect of extension services, while age, household size, years of farming experience, and farm size were not significantly related. It is recommended that Government and other supporters should provide farmers and extension workers with affordable tools like mobile phones, internet access, and computers.

***Keywords**: Arable Crop, Farmers, Agriculture, Extension Services, Livelihood.*
***Keywords:** Azadirachta indica, Helianthus annuus, insecticidal action, phytochemicals, Weevils*

INTRODUCTION

Agriculture supports the livelihoods of rural people in developing countries (World Bank, 2021). The contribution of agriculture to the Gross Domestic Product (GDP) in sub-Saharan Africa is approximately 30% (Jayne and Sanchez, 2021). In developing countries, more than 90% of the rural population depends on rain-fed agriculture for food security and income (Hlophe-Ginindza and Mpandeli, 2021). The contribution of the agriculture sector to the GDP in East Africa is about 40%, being a source of livelihood for approximately 80% of the region's residents (Amwata *et al.*, 2018; Amwata, 2020). In Nigeria, agriculture (practiced by approximately 75% of the rural population) is mainly rain-fed and geared towards subsistence purposes (Kogo *et al.*, 2021). The sector accounts for 33% of GDP and 80% of national rural employment (GOK, 2019). According to Nigerian's Agriculture Sector

Transformation and Growth Strategy, agriculture may be a very effective means of enabling people to earn a living and a useful tool for the country's economic development (GOK, 2019). The Kenya Vision 2030, together with the Big Four Agenda, recognizes the agriculture sector as an economic pillar focused on the promotion of food security and employment creation (Wanderi and Makandi, 2019). Consequently, it influences the country's poverty incidence levels, nutrition, and health, as well as the overall quality of life (Ayieko *et al.*, 2021). To achieve its goals, the agriculture sector should be supported concerning productivity (MOALF and C, 2017).

Mdoda *et al.* (2019) postulated that smallholder agriculture helps sustain livelihoods for farmers and communities through income generation and employment. The Nigerian Government reiterated that agriculture remains one of the most significant economic pillars, serving as a source of energy and food security for all (Federal Ministry of Agriculture and Rural Development, 2020; FAO, 2018). The need for a vibrant agricultural sector in rural households is exacerbated because the majority of dwellers derive their livelihoods from practising farming (World Bank, 2019; IFPRI, 2021). As a result, farming in Africa is dominated by smallholder farming due to the fundamental role they play in establishing better livelihoods and ensuring food security in developing communities in sub-Saharan Africa (AGRA, 2020; FAO, 2021).

Agricultural extension is defined as a system intended to enable farmers, their organizations/groups, and other market actors to access knowledge, information, and technologies to promote agricultural development (Swanson and Rajalahti, 2010). Access to extension has long been a key component that permits farmers to attain information, training, and technologies that can be used to advance their livelihoods and is an important factor in promoting agricultural development (Davis, 2008). The benefit for farmers in accessing extension services is the gaining of strategic partners in research, education, agribusiness, and other relevant institutions, supporting them to develop their technical, organizational, and managerial skills to enhance the agricultural sector. Huerta-Barrientos (2018) posited that extension officers are enablers of farmers' entrepreneurial, social, and ecological capacities in rural areas, allowing them to effectively engage in production and livelihood activities that demand modest positioning and a deep understanding of the environment. This reconstruction of farmers' entrepreneurial capacity helps improve production and, subsequently, rural incomes and welfare and mitigates other rural problems (Adebayo and Worth, 2015). Despite these accolades, extension services appear to be struggling to provide adequate services to farmers, leaving many agriculture-dependent rural dwellers unable to sustain their livelihoods (Rivera and Alex, 2004).

Loki (2017) posited that agricultural extension services are the cornerstone of rural development, serving as the driving force for yield enhancements and sustainable livelihoods. Establishing household food security is widely recognized as an essential breakthrough in improving the living standards of the rural poor and achieving Sustainable Development Goals (SDGs), particularly Objective 1 (no poverty) and Objective 2 (zero hunger). Access to extension is a vital mechanism to educate and equip farmers to achieve these SDG goals through the dissemination of relevant information and technologies.

Hence, this study was conducted to establish the contribution and effect of extension service access on sustainable livelihoods and self-reliance in Eastern Nigeria. Specific objectives of this study were to describe the socio-economic characteristics of the respondents in the study area; identify the types of extension ~~service~~ delivered in the study area; determine the perceived effect of agricultural extension on farmers livelihood and identify the constraints militating against extension services delivery in the study area

Hypothesis of the study

H_o: There is no significant relationship between the socio-economic characteristics of the respondents and perceived effects of agricultural extension on farmers livelihood

Methodology

Description of the study area

The study was carried out in Ona Ara Local Government Area of Oyo State. Ona Ara is a Local Government Area in Oyo State, Nigeria. According to 2006 population census, Ona–Ara

Local Government has a total population of 265,059 made up of 131,471 male and 131,588 female with the land mass of about 3570km. Ona–Ara Local Government is bounded in the northern partly by Egbeda Local Government, in the southern part by Oluyole Local Government Area in the eastern part by Ogun/Osun State and in the western part by Lagos/Ibadan express way with Ibadan South East Local Government area on the other side of the express way.

Population of the study

The population of this study comprised all arable crop farmers in Ona Ara Local Government Area of Oyo State.

Sampling Technique and Sample Size

A multi-stage sampling procedure was employed for this study. In the first stage, four (4) wards were purposively selected from the eleven (11) wards in Ona Ara Local Government Area, namely Akanran I, Araro II, Amuloko V, and Gbedun, based on their rural characteristics. In the second stage, two (2) villages were randomly selected from each of the chosen wards, resulting in a total of eight (8) villages. In the third stage, fifteen (15) arable crop farmers were randomly selected from each village, giving a total sample size of one hundred and twenty (120) respondents for the study.

Data Collection

Primary data were obtained through the use of a well-structured questionnaire.

Data Analysis

Objective i-v were analysed using descriptive statistics such as frequency, mean and percentage while the hypothesis was tested using Chi square and PPMC

RESULTS AND DISCUSSION

Socio economic characteristics of the respondents

Results in Table 1 showed that most (67.5%) of the respondents were male, while 32.5% were female. This indicates that arable crop farming in the study area is male-dominated, implying that male farmers may have greater exposure to extension agents due to higher field participation. The dominance of males in farming activities may enhance adoption of extension innovations due to their increased mobility and decision-making authority. This corroborates the findings of Musa *et al.* (2022), who reported that male farmers are more likely to engage with agricultural innovations and access extension services than their female counterparts.

Results in Table 1 showed that 46.7% of the respondents were above 51 years, 37.5% were between 41–50 years, while 15.8% were between 30–40 years, with a mean age of 45 years. This implies that most farmers are in their mature, economically active age, possessing substantial experience. However, older farmers may be less receptive to innovations compared to younger counterparts. This finding is consistent with Oluwatayo and Ojo (2023), who observed that while age enhances farming experience, it negatively influences the adoption of modern agricultural technologies among Nigerian crop farmers.

Results in Table 1 showed that a most (66.7%) of the respondents were married, while others were single (5.0%), divorced (17.5%), separated (6.7%), or widowed (4.2%). Being married often implies greater household responsibility, which may motivate farmers to adopt extension-recommended practices to improve household livelihood and food security. This corroborates Abubakar and Ibrahim (2021) who found that marital status significantly affects farmers' willingness to engage with extension services and adopt improved practices to support their families.

Results in Table 1 showed that 59.2% of the respondents were Christians, 36.7% Muslims, and 4.2% practiced Traditional religion. Religious affiliation can influence farmers' worldview, social networks, and access to community-based extension initiatives, especially through faith-based agricultural programs. According to Ahmed and Okoye (2022), religious groups in Nigeria increasingly support agricultural training and cooperative initiatives, thereby aiding access to extension services.

Results in Table 1 showed that 57.5% of the respondents had secondary education, 35.0% had tertiary education, while 7.5% had only primary education. This suggests a moderately literate farming population, which enhances the understanding and application of extension information. This finding is in line with Ezeano and Ojiako (2023), who reported that educational

attainment significantly improves farmers' responsiveness to agricultural innovations and extension training.

Results in Table 1 showed that 65.0% of respondents had a household size of 1–5 persons, 30.0% had 6–10 persons, and 5.0% had more than 11 persons, with a mean of 5 persons. A smaller household size may limit available family labor but may encourage mechanization or extension-recommended labour-saving technologies. This is supported by Chukwu *et al.* (2022), who noted that small family size often leads to higher demand for productivity-enhancing extension services to offset labour shortages.

Results in Table 1 showed that 40.0% of respondents were artisans, 36.7% were traders, 18.3% civil servants, and 5.0% clergy. Having a secondary occupation indicates income diversification, which can enhance investment in farm innovations and services promoted by extension agents. According to Yakubu and Salihu (2022), farmers with non-farming income sources are more likely to adopt new farming methods due to increased financial stability.

Results in Table 1 showed that 27.5% of respondents purchased their land, 22.5% inherited, 20.0% rented, while others had gifted (15.0%) or leased (15.0%) land. Farmers with secure land tenure (purchased or inherited) are more willing to adopt long-term extension technologies such as improved soil management. This supports Lawal *et al.* (2021) who emphasized the importance of land tenure security in agricultural investment and extension participation.

Results in Table 1 showed that 40.8% had 6–10 years of experience, 30.8% had 1–5 years, and 28.3% had above 11 years, with a mean experience of 7 years. Farmers with moderate to high experience are better placed to assess the relevance of extension advice and adapt it to local conditions. This corroborates the findings of Okoro and Sunday (2023), who observed that farming experience positively influences extension service usage and adoption of innovation.

Results in Table 1 showed that 71.7% of respondents were members of a cooperative, while 28.3% were not. Cooperative membership enhances access to collective training, inputs, credit, and extension information. Extension agents often target cooperatives for group dissemination. This agrees with Umeh and Nwachukwu (2022) who found that cooperatives significantly increase access to agricultural extension services among rural farmers.

Results in Table 1 showed that 60.0% belonged to farmer associations, while 40.0% did not. Associations promote knowledge-sharing, access to innovation, and bargaining power, and serve as channels for extension training and input support. This is consistent with Adebayo *et al.* (2023), who highlighted the role of farmer groups in increasing rural farmers' participation in extension-led interventions.

Results in Table 1 showed that 63.3% of the respondents had access to extension services, while 36.7% did not. This is a positive indicator of extension outreach, which plays a central role in increasing productivity and sustainability. This corroborates Ogunniyi and Bolarinwa (2022), who reported that access to extension services improves farmers' decision-making capacity and livelihood outcomes.

Results in Table 1 showed that 40.8% cultivated maize, 34.2% cultivated cassava, and 25.0% yam. These are staple crops targeted by many extension programs due to their importance in food security and economic value. According to FAO Nigeria (2022), maize and cassava are priority crops in national extension campaigns due to their role in poverty alleviation.

Results in Table 1 showed that 41.7% of the respondents had farms between 6–10 hectares, 33.3% had 1–5 ha, and 25.0% had above 11 ha, with a mean size of 8 ha. This suggests the farmers operate at a semi-commercial level, which can enhance extension service adoption due to the need for improved productivity. This supports Akinyemi and Ayinde (2021), who found that farm size is a determinant of technology adoption and access to extension advice.

Results in Table 1 showed that 37.5% of farmers sourced credit from cooperatives, 35.8% from banks, and 22.5% from microfinance institutions. Only 2.5% relied on family/friends, and 1.7% self-funded. Institutional credit access increases capacity to implement extension recommendations, especially on inputs and mechanization. This corroborates Nnadi *et al.* (2023) who observed that access to formal credit significantly enhances farmers' ability to adopt improved farming practices.

Variable	Frequency	Percentage	Mean
Sex			
Male	81	67.5	
Female	39	32.5	
Age			
30 – 40	19	15.8	
41 – 50	45	37.5	45 years
Above 51	56	46.7	
Marital status			
Single	6	5.0	
Married	80	66.7	
Divorced	21	17.5	
Widowed	5	4.2	
Separated	8	6.7	
Religion			
Islam	44	36.7	
Christianity	71	59.2	
Traditional	5	4.2	
Educational level			
Primary	9	7.5	
Secondary	69	57.5	
Tertiary	42	35.0	
Household size			
1 – 5	78	65.0	5 persons
6 – 10	36	30.0	
Above 11	6	5.0	
Secondary occupation			
Trading	44	36.7	
Clergy	6	5.0	
Civil service	22	18.3	
Artizan	48	40.0	
Mode of land ownership			
Purchased	3 3	27.5	
Inherited	2 7	22.5	
Rented	2 4	20.0	
Gifted	1 8	15.0	
Leased	1 8	15.0	
Year of farming experience			
1 – 5	37	30.8	
6 – 10	49	40.8	7 years
Above 11	34	28.3	
Cooperative society			
Yes	86	71.7	
No	34	28.3	
Farmer association			
Yes	72	60.0	
No	48	40.0	
Access to extension service			
Yes	76	63.3	
No	44	36.7	
Type of arable crop practices			
Cassava	41	34.2	
Maize	49	40.8	
Yam	30	25.0	
Farm size			
1 – 5	40	33.3	
6 – 10	50	41.7	8ha
Above 11	30	25.0	
Bank	43	35.8	
Cooperative	45	37.5	
Family and friends	3	2.5	
Micro finance	27	22.5	
Self	2	1.7	

Source: Field survey; 2025

Types of extension service delivered

Results in Table 2 showed the types of extension services delivered to the respondents. The results indicate that the majority (79.2%) of the respondents received advisory services. This was followed by moderate access to livestock extension services (47.5%), input supply services (46.7%), market information services (46.7%), and nutrition and food security education (50.0%). The implies that, while conventional advisory services remain widely delivered and trusted among farmers, the limited reach of other vital services such as digital tools, research linkages, climate change education, and training programs reflects systemic gaps in the extension delivery framework. This finding is consistent with Ayanwale *et al.* (2023), who emphasized that while traditional advisory services are dominant, access to digital and research-based innovations remains poor due to infrastructural, institutional, and capacity limitations. Similarly, Adeogun *et al.* (2022) reported that a significant proportion of smallholder farmers in Nigeria lack access to climate-smart and research-driven extension content, making them vulnerable to climate shocks and post-harvest losses.

Table 2: Types of extension service delivered

Types extension service delivered	Yes	No
Advisory Services	95(79.2)	25(20.8)
Climate Change Education	25(20.8)	95(79.2)
Community Development Programs	51(42.5)	69(57.5)
Digital Extension Services	56(42.7)	64(53.3)
Financial Services	50(41.7)	70(58.3)
Input Supply Services	56(46.7)	64(53.3)
Livestock Extension Services	57(47.5)	63(52.5)
Market Information Services	56(46.7)	64(53.3)
Nutrition and Food Security Education	60(50.0)	60(50.0)
Pest and Disease Management	53(44.2)	67(55.8)
Post-Harvest Management Training	37(30.8)	83(69.2)
Research and Development Services	26(21.7)	94(78.3)
Soil and Water Management Services	34(28.3)	86(71.7)
Training and Capacity Building	26(21.7)	94(78.3)
Women and Youth Empowerment Programs	45(37.5)	75(62.5)

Source: Field survey; 2025
Figures in parentheses are in percentage

Perceived effect of agricultural extension services on farmers livelihood

Results in Table 3 revealed the perceived effects of agricultural extension services on farmers' livelihood. The results show that farmers receiving knowledge on improved agricultural practices, which leads to higher productivity and yields (mean = 4.50) was ranked 1st. This was closely followed by exposure to extension services encouraging farmers to diversify their crops, reducing risk and improving food security (mean = 4.39), ranked 2nd. Other highly perceived effects include training on soil conservation techniques to maintain soil fertility (mean = 3.92), facilitated access to credit and financial support (mean = 3.92), training on market requirements to improve access to markets (mean = 3.92), and provision of pest and disease control information (mean = 3.88), which were ranked 3rd, 3rd, 3rd, and 6th respectively. Furthermore, continuous training that improves farmers' skills and knowledge (mean = 3.70) and knowledge about irrigation and water conservation through extension practices (mean = 3.67) were ranked 15th and 14th respectively making them the two least perceived livelihood-improving effects of extension service delivery among the respondents.

This implies that farmers in the study area place the highest value on agricultural extension services that result in immediate and tangible improvements in yield, income, and food

security. The high ranking of productivity-related services such as improved practices, diversification, soil conservation, market linkage, and pest control reflects a preference for interventions that address core agronomic and economic challenges. These findings are consistent with Agbamu (2011) and Ayanwale *et al.* (2020), who observed that farmers tend to prioritize agricultural extension interventions that deliver visible and immediate results, particularly in contexts of limited resources and high production risks.

Perceived effects	SA	A	U	SD	D	WMS	Rank
Farmers receive knowledge on improved agricultural practices, which leads to higher productivity and yields.	44(36.7)	3(2.5)	3(2.5)	70(58.3)	0(0.0)	4.50	1st
Exposure to extension services encourages farmers to diversify their crops, reducing risk and improving food security.	46(38.3)	9(7.5)	3(2.5)	62(51.7)	0(0.0)	4.39	2nd
Training on soil conservation techniques helps maintain soil fertility, thereby enhancing crop growth.	84(70.0)	18(15.0)	3(2.5)	0(0.0)	15(12.5)	3.92	3rd
Extension services often provide farmers with access to high-quality seeds, leading to better crop performance.	80(66.7)	23(19.2)	4(3.3)	0(0.0)	13(10.8)	3.85	8th
Farmers learn about sustainable farming methods that protect the environment and promote long-term productivity.	54(45.0)	33(27.5)	1(0.8)	3(2.5)	29(24.2)	3.87	7th
Extension agents provide information on pest and disease control, reducing crop losses.	27(22.5)	52(43.3)	1(0.8)	0(0.0)	40(33.3)	3.88	6th
Extension services can facilitate access to credit and financial support for farmers to invest in their operations.	30(25.0)	42(35.0)	5(4.2)	0(0.0)	43(35.8)	3.92	3rd
Training helps farmers understand market requirements, improving their access to local and international markets.	48(40.0)	36(30.0)	3(2.5)	0(0.0)	33(27.5)	3.92	3rd
Farmers can learn about modern farming technologies, improving efficiency and productivity through extension service	53(44.2)	36(30.0)	5(4.2)	0(0.0)	26(21.7)	3.83	10th
Knowledge about irrigation and water conservation acquired through extension service delivery practices helps farmers optimize water use.	47(39.2)	41(34.2)	10(8.3)	0(0.0)	22(18.3)	3.67	15th
Extension promotes the formation of cooperatives, enhancing collective bargaining and resource sharing.	39(32.5)	41(34.2)	11(9.2)	0(0.0)	29(24.2)	3.71	13th
Continuous training improves farmers' skills and knowledge, leading to better management practices.	34(28.3)	35(29.2)	17(14.2)	0(0.0)	34(28.3)	3.70	14th
As a result of improved practices and better market access, farmers experience enhanced income levels and economic resilience which can be attributed to extension service delivery	34(28.3)	40(33.3)	10(8.3)	0(0.0)	36(30.0)	3.80	11th
By improving agricultural productivity, extension services contribute to food availability and security for communities.	41(34.2)	33(27.5)	12(10.0)	0(0.0)	34(28.3)	3.80	11th
Targeted extension programs support women, enhancing their role in agriculture and promoting gender equity.	49(40.8)	37(30.8)	5(4.2)	0(0.0)	29(24.2)	3.85	8th

Key: SA= Strongly agree, A= Agree, U=Undecided, SD=Strongly disagree, D=Disagree Source: Field survey; 2025 Figures in parentheses are in percentage

Challenges militating against extension services delivery in the study area

Results in Table 4 revealed the challenges militating against effective extension service delivery in the study area. The results show that limited access to technology (mean = 2.45) was ranked 1st as the most severe constraint. This was closely followed by weak collaboration with research institutions (mean = 2.40), poor infrastructural facilities (mean = 2.35), inadequate funding (mean = 2.29), and insufficient training and capacity building (mean = 2.24), which were ranked 2nd, 3rd, 4th, and 5th respectively. Furthermore, lack of in-depth knowledge of extension agents on subject matters (mean = 2.00) was ranked 13th, and infrequent or irregular visits by extension agents (mean = 1.98) was ranked 14th making them the two least perceived constraints among the respondents. This implies that farmers consider structural and systemic issues such as access to modern technology, research-extension linkages, and funding as the most pressing obstacles to effective extension delivery. These top-ranked challenges reflect a shift in farmers' priorities toward innovation-driven and well-supported extension systems. The prominence of limited access to technology supports the findings of Arokoyo (2012) and Olowogbon (2022), who emphasized that the digital divide and poor technological penetration undermine extension effectiveness in Nigeria.

Table 4: challenges militating against extension services delivery in the study area

Constraints	Very severe	Severe	Not severe	WMS	Rank
Inadequate Funding	71(59.2)	7(5.8)	42(35.0)	2.29	4th
Insufficient Training and Capacity Building	65(54.2)	13(10.8)	42(35.9)	2.24	5th
Poor Infrastructural facilities	61(50.8)	8(6.7)	51(42.5)	2.35	3rd
Limited Access to Technology	52(43.3)	7(5.8)	61(50.8)	2.45	1st
Weak Collaboration with Research Institutions	49(40.8)	11(9.2)	60(50.0)	2.40	2nd
Low Farmer Participation	40(33.3)	27(22.5)	53(44.2)	2.22	6th
Cultural and Socioeconomic Barriers	48(40.0)	26(21.7)	46(38.3)	2.17	7th
Inadequate Coverage by extension agents	53(44.2)	29(24.2)	38(31.7)	2.08	10th
High Turnover of Staff	40(33.3)	35(29.2)	45(37.5)	2.08	10th
Political and Administrative Challenges	40(33.3)	39(32.5)	41(34.2)	2.02	12th
Infrequent/irregular visit	43(35.8)	40(33.3)	37(30.8)	1.98	14th
Lack of in-depth knowledge of extension agents on subject matters	48(40.0)	36(30.0)	36(30.0)	2.00	13th
High cost of recommended inputs/processes	68(56.7)	18(15.0)	34(28.3)	2.13	9th
Irrelevant content disseminated to farmers	76(63.3)	12(10.0)	32(26.7)		

Source: Field survey; 2025 Figures in parentheses are in percentage

Chi-square analysis showing significant relationship between some selected socio-economic characteristics of the respondents and perceived effect of effect of agricultural extension on farmers livelihood

The result in Table 5 shows the relationship between selected socio-economic characteristics of the respondents and the perceived effect of agricultural extension services on farmers' livelihood. The results reveal that sex (χ^2 =

13.095; $p = 0.004$), marital status ($\chi^2 = 22.061$; $p = 0.037$), membership in cooperative society ($\chi^2 = 10.348$; $p = 0.016$), and sources of credit ($\chi^2 = 26.539$; $p = 0.009$) were significantly related to the perceived effect of agricultural extension. This suggests that these factors influence how farmers benefit from extension services, possibly due to differences in access to resources, responsibilities, and group support. On the other hand, variables such as religion ($\chi^2 = 6.839$; $p = 0.654$), educational status ($\chi^2 = 2.403$; $p = 0.879$), secondary occupation ($\chi^2 = 12.500$; $p = 0.187$), mode of land ownership ($\chi^2 = 22.834$; $p = 0.197$), membership in farmer associations ($\chi^2 = 2.834$; $p = 0.418$), and access to extension services ($\chi^2 = 1.799$; $p = 0.937$) were not significantly related. This may indicate that while these variables are important in profiling farmers, they do not independently influence how extension services effect their livelihood in the study area. These findings are consistent with Akinbile and Alao, (2018) which noted that gender roles, marital status, credit access, and cooperative membership significantly affect farmers' capacity to utilize extension information effectively.

Table 5: Chi-square analysis showing significant relationship between some selected socio-economic characteristics of the respondents and perceived effect of agricultural extension on farmers livelihood

Variables	Chi-square value	df	p-value	Decision
Sex	13.095	3	0.004	Significant
Marital status	22.061	12	0.037	Significant
Religion	6.839	9	0.654	Not Significant
Educational status	2.403	6	0.879	Not Significant
Secondary occupation	12.500	9	0.187	Not Significant
Mode of land ownership	22.834	18	0.197	Not Significant
Cooperative society	10.348	3	0.016	Significant
Did you belong to farmer association	2.834	3	0.418	Not Significant
Access to extension services	1.799	6	0.937	Not Significant
Sources of credit	26.539	12	0.009	Significant

Source: Field survey; 2025

4.5.1: PPMC analysis showing significant relationship between the some selected socio-economic characteristics of the respondents and perceived effect of agricultural extension on farmers livelihood

The result in Table 5.1 shows the PPMC analysis between selected socio-economic characteristics and the perceived effect of agricultural extension services on farmers' livelihood. The findings reveal that age ($r = 0.138$; $p = 0.840$), household size ($r = 0.011$; $p = 0.860$), years of farming ($r = 0.038$; $p = 0.067$), and farm size ($r = 0.192$; $p = 0.120$) were not significantly related to the perceived effect. This implies that these factors did not influence how farmers perceived the benefits of extension services in the study area, suggesting uniform effect across different socio-economic groups.

Table 5.1: PPMC analysis showing significant relationship between the some selected socio-economic characteristics of the respondents and perceived effect of effect of agricultural extension on farmers livelihood

Variables	r-value	p-value	Decision
Age	0.138	0.840	Not Significant
Household size	0.011	0.860	Not Significant
Year of farming	0.038	0.067	Not Significant
Farm size	0.192	0.120	Not Significant

Source: Field survey; 2025

Conclusion

From the findings of this study, it is concluded that the majority of the respondents were male, above 51 years of age, married, and had attained secondary education. Most of them operated small household sizes and had experience in arable crop farming, with many identifying as artisans. Land acquisition was mostly through purchase and inheritance. A significant proportion were members of cooperative societies and farmers' associations, with many accessing extension services and cultivating crops such as maize on farms between 6–10 hectares. The study further concludes that advisory services were the most frequently delivered extension service, and that farmers strongly agreed that agricultural extension services improved their productivity and encouraged crop diversification, thereby enhancing food security. However, limited access to technology and weak collaboration with research institutions were key challenges affecting extension service delivery in the study area. The hypothesis test revealed that socio-economic characteristics such as sex, marital status, membership in cooperative societies, and sources of credit significantly influenced the perceived effect of agricultural extension.

Recommendations

Extension workers should work closely with research centers so that new farming methods and findings can be shared with farmers easily. Meetings, workshops, and training programs should be organized so both researchers and extension agents can share ideas and solve farmers' problems together.

Government should improve basic facilities like roads, electricity, and water supply in farming areas. Good roads will help extension workers reach farmers easily and allow farmers to transport their goods to markets without delay. With more funding, extension workers will have the tools, transport, and materials they need to reach more farmers and do their job better.

Extension workers should receive regular training to improve their knowledge and skills. These trainings should teach them better ways to pass information to farmers and keep them updated on modern and smart farming techniques.

References

Adebayo, K., and Worth, S. (2015). Reconstruction of farmers' entrepreneurial capacity to improve rural incomes and welfare. *Journal of Agricultural Extension and Rural Development, 7*(5), 101–110.

Amwata, D. A., Kinyua, J. M., and Mgutu, A. A. (2018). The contribution of agriculture to GDP in East Africa: Challenges and opportunities. *African Journal of Agricultural Research, 13*(3), 123–130.

Ayieko, D. M., Mose, L. O., and Korir, M. K. (2021). Agriculture, food security, and the SDGs: Evidence from sub-Saharan Africa. *Food Policy, 97*, 101891.

Davis, K. (2008). Extension in sub-Saharan Africa: Overview and recommendations for the future. *The Journal of Agricultural Education and Extension, 14*(3), 203–216.

FAO. (2018). The role of agriculture in economic transformation and development. *Food and Agriculture Organization of the United Nations*.

FAO. (2021). Smallholder agriculture and its effect on food security in Africa. *Food and Agriculture Organization of the United Nations*.

Federal Ministry of Agriculture and Rural Development. (2020). Nigeria's agricultural policies for sustainable development. *FMARD Annual Report*.

GOK. (2019). Nigerian agricultural policies and development strategies. *Government of Kenya Agricultural Report*.

Hlophe-Ginindza, S., and Mpandeli, S. (2021). The role of rain-fed agriculture in developing countries: Opportunities and challenges. *Climate and Development, 13*(2), 159–168.

Huerta-Barrientos, A. (2018). Agricultural extension officers and the development of rural livelihoods. *International Journal of Agricultural Extension, 6*(3), 187–195.

Kogo, B. K., Maina, J. N., and Nyasimi, M. (2021). Rain-fed agriculture in Nigeria: Challenges and prospects. *Journal of Agricultural Science, 13*(1), 93–106.

Loki, T. (2017). The role of agricultural extension in rural development. *Journal of Rural Studies, 55*, 154–162

Mdoda, L., Ndhlovu, P. T., and Mutengwa, C. S. (2019). Smallholder agriculture and its effect on rural livelihoods in Africa. *Development Southern Africa, 36*(4), 567–578.

MOALF and C. (2017). Promoting food security and employment creation through agriculture. *Ministry of Agriculture, Livestock, Fisheries, and Cooperatives Annual Report*.

Swanson, B. E. (2008). Global review of good agricultural extension practices. *FAO Extension Guide*.

Wanderi, D. M., and Makandi, N. (2019). The Kenya Vision 2030: Strategies for achieving food security and employment creation. *Kenya Agricultural Review, 15*(4), 78–87.

World Bank. (2019). Food security and agriculture: Key drivers of rural development. *World Bank Annual Report*.

World Bank. (2021). Agriculture and livelihoods in developing countries. *World Development Indicators*.