



**PERCEIVED EFFECTIVENESS OF EXTENSION SERVICE DELIVERY UNDER
INSURGENCY AMONG WHEAT PRODUCING FARMERS IN SOUTHERN BORNO,
BORNO STATE, NIGERIA**

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ABSTRACT

The study examined the perceived effectiveness of extension service delivery under insurgency among wheat-producing farmers in Southern Borno, Nigeria. A multistage sampling technique was used to select 322 wheat farmers from Bayo and Biu LGAs. Data were collected using structured questionnaires and analyzed using descriptive statistics and logistic regression. Results revealed that respondents were predominantly middle-aged (mean = 43 years), had an average household size of 9 persons, and mostly operated on small farm sizes (0.5–1.0ha). The most widely disseminated technologies included improved seed varieties (84.9%), fertilizer application (84.9%), and pest and disease control practices (84.9%). Farmers rated improved seed varieties, fertilizer use, pest control, and post-harvest handling as effective, while modern irrigation techniques were perceived as not effective. Logistic regression results showed that sex, marital status, cooperative membership, years of membership, frequency of extension contact, access to credit, and method of land acquisition significantly influenced access to extension services ($P < 0.05$). The study concludes that while extension services remain relevant and moderately effective, insurgency has severely constrained mobility, frequency of contact, and technology dissemination. Strengthening extension delivery mechanisms, particularly through cooperatives, ICT tools, and enhanced security support, is recommended to improve resilience and wheat productivity in conflict-affected regions.

Keywords: Effectiveness, Extension, Insurgency and Wheat

INTRODUCTION

Humans and the environment are interconnected as man exploits the environment to meet man's need for food, clothing, and shelter. Agriculture is an age-long activity undertaken by the early man who went about scavenging for wild crops and animals with little or no threat to the natural ecosystem (Maude, 2020). Today, agriculture has grown in all ramifications through innovative research and other developmental efforts by relevant stakeholders to meet the food needs of the growing population. The world's population has been increasing from 32 million people in 1950 to about 600m people today and is expected to grow to about 8.5 billion by 2030 (The Guardian, 2022). Efforts are geared towards producing enough food on the same mass of land for the teeming population using diverse scientific methods and agricultural technologies such as pesticides, inorganic fertilizer application, and herbicides which pose a threat to the environment and natural ecosystem and hence, the need for sustainable practices to ensure that the needs of today's generation are met without compromising the ability of future generations to meet their own needs (Anani *et al.*, 2020; Feenstra *et al.*, 2021).

Sustainable practices can facilitate the protection of the natural ecosystem, increase yield, improve food security, and reduce rural poverty. Nigeria is far from reaching its Sustainable Development Goals (SDGs) come 2030, but sustainable agricultural practices can contribute to achieving goals of no poverty, zero hunger, responsible consumption and production, climate action, and sustainable cities and communities (Otekunrin *et al.*, 2019). Hassan and Kumar (2021) Agriculture has been acknowledged as an important sector in the Nigerian economy, and is still a significant sector. The sector basically provides employment opportunities for the teeming population, eradicates poverty and contributes to the growth and development of the economy. Oji-Okoro (2018) Agriculture is fundamental to the sustenance of life and the bed rock of economic growth.



Agricultural extension is a process of disseminating agricultural information, ideas, knowledge and skills among individuals that mainly constitutes the rural farming households. Thus, extension includes the transfer of technical information and innovation from its source (research institute) to the farmers through the effort of agricultural extension workers. Agricultural extension workers serve as a link between the farmers and the research institutes in the diffusion of innovation, they help in the dissemination of useful information about advanced technologies that aid rural farmers in enhancing their source of livelihood. Agricultural extension workers as influential factors enhance and promote the adoption of improved technologies and innovation. However, their effectiveness depends largely on their competence in the transfer and decoding of information from extension organization or institutes to the clientele (Agbarevo & Benjamin 2013; Aldosari *et al.*, 2019). Therefore, the role of extension agents in raising farmers' awareness and knowledge level towards sustainable agricultural practices cannot be over-emphasized. Since the extension is the vehicle through which agricultural technologies are disseminated to rural farmers, it, therefore, becomes pertinent that the extension agents are thoroughly furnished with adequate knowledge and possess skills needed to carry out extension work and to achieve this goal, the extension agents have to understand the principles of extension work and its application in order to successfully help farmers change their skill, attitude, and knowledge as regards to sustainable agricultural practices (Olorunfemi *et al.*, 2020).

Despite the critical role of agriculture in ensuring food security and sustaining livelihoods in Nigeria, particularly in Borno State, the persistent insurgency has severely disrupted farming activities. This disruption has led to significant declines in productivity, escalating costs, and widespread displacement of farmers. Such instability directly threatens the availability and affordability of staple foods, thereby exacerbating food insecurity and poverty across the region. The pervasive dislocation of livelihoods and the constant state of farmers being on the run indicate a fundamental shift in the agricultural operational environment. This suggests that traditional agricultural extension models, typically designed for stable conditions, may be inherently challenged or require substantial adaptation to remain relevant and effective in such volatile settings. The problem extends beyond a simple assessment of current effectiveness to understanding how extension services adapt to and mitigate these profound and systemic disruptions.

Agricultural extension services are designed to provide crucial support, information, and training to farmers, enabling them to improve practices and adapt to various challenges. However, the effectiveness of these services is likely severely compromised in conflict-affected areas due to a multitude of factors, including pervasive security risks, restricted movement, damaged infrastructure, and the displacement of both farmers and extension agents. While the general impacts of insurgency on agriculture in Borno State are well-documented, there is a distinct lack of specific empirical research on the perceived effectiveness of agricultural extension services for wheat-producing farmers operating under insurgency in Bayo and Biu Local Government Areas. This absence of crop specific and localized data is particularly salient given that Borno is a major producer of staple foods and wheat is a key crop in the broader northern region, including Borno. Existing studies often generalize impacts without delving into the specific and particular crops or localized areas, which are vital for developing tailored extension strategies. This research holds significant academic, practical, and policy contributions, addressing critical gaps and providing actionable insights for agricultural development in conflict-affected regions. This study addresses a critical gap in the existing academic literature by specifically examining the perceived effectiveness of agricultural extension services for wheat-producing farmers under insurgency in the unique context of Bayo and Biu Local Government Areas. While a substantial body of research exists on agricultural extension effectiveness and the devastating impact of conflict on agriculture, the precise intersection of these specific elements remains underexplored.

The broad objective of this study was to examine the perceived effectiveness of extension service delivery under insurgency among wheat producing farmers in Southern Borno, Borno State. While the specific objectives were to:

- i. describe the socio-economic characteristics of respondents in the study area;



- ii. identify the types and effectiveness of technologies delivered to farmers;
- iii. determine the factors influencing farmers access to extension service

METHODOLOGY

The Study Area

The study was conducted in Borno State. It lies in the North-East Part of Nigeria, with an estimated land area of 73,273km². Borno State roughly lies between Latitudes 11° 09'1" and 11° 04'1" North of the equator and longitudes 09° 10'1" and 14° 20'1" East of the Greenwich Meridian BOSADP cited in Borno State Final Report, (2018). The State shares international boundaries with Niger Republic in the North, Chad Republic in the North-East and the Cameroon republic in the East. Nationally Borno State shares boundaries with Adamawa State to the South, Yobe State to the West and Gombe State to the South-East with an estimated population of 4,151,193 people National Population Commission (NPC) (2006) projected to 6,111,500 in 2025 at 3.4% annual growth rate. The study area is made up of 27 Local Government Areas (LGAs) spread over four Agro-Ecological Zones (AEZs)-The Arid, Sahel Savanna in the North, Sudan Savanna in the Center and the Northern and Southern Guinea Savanna in South of the State. Borno State has a hot climate for most part of the year especially in the Northern part of the State while the Southern parts are slightly milder in temperature. The rainy season starts from June to September in the North and May to October in the South. The rainy season varies from Northern part to Southern part of the State with the latter having 1000mm of rainfall per annum while the former records 250mm per annum Ayuba cited in Borno State Final Report (2018). Agriculture is the main stay of the state economy. The major crops cultivated include millet, sorghum, maize, wheat, rice, cowpea, groundnut and vegetables. The major livestock types found in the State consists of cattle, camel, sheep and goats. Agricultural extension services have been mainly public provided. Currently the major provider of agricultural extension services is Borno State Agricultural Development Programs (BOSADP). It plays a dominant role in the provision of agricultural extension services (Bello and Salau, 2009).

Sampling Technique and Sample Size

Multi stage sampling technique was used in selecting respondents for the study. In the first stage two Local Government Areas (LGAs) Bayo and Biyu were purposively selected due to average security level and large farming households. In the second stage proportionate sample of 322 respondents were drawn from a total population of 1,645 wheat farmers in the selected LGAs. In the final stage simple random sampling technique was used in selecting 181 and 141 respondents from Bayo and Biu LGAs, respectively.

Table 1: Sampling Frame and Sampling Size

LGAs	Sample frame	Sample size
Bayo	924	181
Biu	721	141
Total	1,645	322

Method of Data Collection

Data were collected through administration of structured questionnaires. Primary data were collected from the farmers on information like socioeconomic characteristics, types of technologies and methods of dissemination of technologies provided by extension service and problems associated with extension service programmes delivery.

Likert Type

Likert type was used to assess the effectiveness of the extension services received by the farmers. Likert type was used as; Highly Effective (5), Effective (4), Moderately Effective (3), Not Effective (2), Don't know (1).

$$5+4+3+2+1=15/3=3.0$$

Mean score of < 3.0= Not effective, while mean score of ≥ 3.0 = Effective.



Methods Data Analysis

Data was analyzed using both descriptive and inferential statistics such as frequency, mean and percentage and inferential statistics using regression analysis.

Descriptive statistics

Descriptive statistics was used to achieve objectives i, ii, iii, iv and vi. This tool will be employed to give a summary description of the data collected.

Logistic regression analysis

Linear regression analysis will be employed to satisfy the fifth objective. This model will be used to analyze the socioeconomic factors influencing assess to extension service delivery by the farmers. The regression model to be used is specified as; Linear function:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + U \quad \dots (1)$$

Where;

Y= Extension service access (1=Yes, 2=No)

X₁=Age of the respondent (years)

X₂=Sex (male=1, female=2)

X₃=Marital status (single=1, married=2, divorced=3, widowed=4)

X₄=Level of education (No formal education=1, Primary education=2, Secondary education=3, Tertiary education=4, Adult education=5)

X₅=Household size (no of persons)

X₆=Farming experience (years)

X₇ = Farm size (ha)

X₈ =Membership of cooperatives (Yes=1, No=2)

X₉ =Years of membership in cooperatives (Number)

X₁₀ =Frequency of extension contact (Weekly=1, Fortnightly=2, Monthly=3, Quarterly=4, Annually=5)

X₁₁ = Access to credit (Yes=1, No=2)

X₁₂ = Method of land acquisition (Inheritance=1, Purchase=2, Gift=3, Leasehold=4, Rent=5)

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

Quantitative socioeconomic characteristics

The results in Table 2 shows that 25.7%, 23.5% and 22.2% of the respondents fell within the age range of 33–41 years, 42–50 years and 24–32 years, with a mean age of 43 years, respectively. This finding implies that majority of the farmers are in their economically active age, which is a productive phase associated with greater physical capacity and openness to adopting and utilizing new agricultural technologies. The predominance of middle-aged farmers is consistent with findings by Agada *et al.* (2020), who reported that wheat farmers in Northern Nigeria are largely middle-aged, thereby capable of engaging effectively in labor-intensive activities despite insurgency challenges. The implication of this is that extension service delivery has the potential to achieve higher adoption levels if tailored toward this productive age bracket.

The result also revealed that the majority (64.3%) of the respondents had 1–6 household members, with an average size of 9. This indicates relatively small household sizes, suggesting limited availability of unpaid family labor for farming activities. As a result, farmers may have to rely on hired labor, which could increase production costs and reduce net profitability, particularly under conditions of insecurity where labor supply is disrupted. This finding aligns with Eze *et al.* (2021), who noted that small household sizes limit farming households' resilience in conflict-prone areas by reducing their labor buffer. The finding also shows that 36.3% of the respondents had between 2–6 years of experience, while 21.9% had long-term experience of 25–38 years, with an overall mean of 13 years. This shows a mix of both relatively new entrants and long-term farmers in wheat production. Experience in farming is crucial for decision-making, risk assessment, and adoption of innovations. The implication is that farmers with more years of experience may have developed coping strategies to deal with insurgency-induced challenges, while new entrants may rely heavily on extension advice.



This supports the observation of Ogunjimi and Abiodun (2020) that farming experience is a determinant of how well farmers adapt to both climatic and conflict-related shocks.

Table 2: Distribution of Respondents According to their Quantitative Socioeconomic Characteristics

Socio-economic Characteristics	Frequency	Percentage	Mean
Age			
24 – 32	69	22.2	43
33 – 41	80	25.7	
42 – 50	73	23.5	
51 – 59	45	14.5	
60 – 69	44	14.1	
House hold size			
1 – 6	200	64.3	9
7 – 12	22	7.1	
13 – 18	21	6.8	
19 – 24	35	11.3	
25 – 33	33	10.6	
Total			
Farming Experience			
2 – 6	113	36.3	13
7 – 12	59	19.0	
13 – 18	50	16.1	
19 – 24	21	6.8	
25 – 38	68	21.9	
Farm size			
0.5 – 1.0	172	55.3	1.7
1.1 – 1.6	73	23.5	
1.7 and Above	66	21.2	
2.2 – 2.7			
2.8 – 6.0			
Years of cooperative membership			
0 – 6	113	36.3	9
7 – 12	59	19.0	
13 – 18	50	16.1	
19 – 24	45	14.5	
25 – 38	44	14.1	

Source: Field Survey, 2025

The finding shows that majority (55.3%) operated on 0.5–1.0 hectares, 23.5% cultivated 1.1–1.6 hectares, and only 21.2% had 1.7 hectares and above, with an average of 1.7 hectares. This finding indicates that wheat farming in the study area is dominated by smallholder farmers. Small farm sizes often constraint economies of scale, thereby limiting productivity and profitability. This is in line with the findings of Garba *et al.* (2022), who emphasized that the prevalence of small-scale farming in insurgency-affected zones further increases vulnerability, as farmers are unable to invest in mechanization and advanced technologies. The implication is that extension services must focus on low-cost, scalable innovations suitable for smallholder contexts. Regarding years of cooperative membership, 36.3% had 0–6 years, while only 14.1% had as long as 25–38 years of membership, with an average of 9 years. This indicates that most farmers are relatively new to cooperative groups. Cooperatives are critical platforms for accessing extension, credit, and inputs, but short membership duration suggests that their benefits may not have been fully maximized. This supports the report of Yusuf *et al.* (2021), who highlighted that strong cooperative membership is crucial for sustaining extension access and improving resilience in conflict-prone agricultural systems. The implication here is that strengthening cooperative societies could enhance collective action, improve bargaining power, and make farmers less vulnerable to the disruptions caused by insurgency.



Types of Wheat Production Technologies Received by Farmers

The findings in Table 3 reveal that the majority (84.9%) of the respondents reported receiving improved seed varieties, modern fertilizer application and pest and disease control practices. This shows that extension agents prioritized the dissemination of critical production-enhancing technologies that directly improve yield and productivity. The predominance of these three technologies suggests that extension systems in Bayo and Biu LGAs are focused on addressing the fundamental constraints of wheat production such as low-yielding varieties, poor soil fertility, and vulnerability to pests and diseases. Similar findings were reported by Musa *et al.* (2020), who observed that improved seed varieties and fertilizer recommendations significantly enhanced wheat yields in Northern Nigeria. The implication here is that sustained provision and adoption of these technologies could boost production levels even under insurgency, contributing to food security and farmer resilience.

Table 3: Distribution of Respondents According to their Wheat Production Technologies Received from Extension Agents

Variable	Frequency	Percentage
Improved seed varieties	264	84.9
Modern fertilizer application	264	84.9
Pest and disease control practices	264	84.9
Post-harvest handling and storage	236	75.9
Modern irrigation techniques	137	44.1

Source: Field Survey, 2025

In addition, a large proportion (75.9%) of the respondents indicated access to post-harvest handling and storage practices. This is particularly important in reducing post-harvest losses, which are common in conflict-affected regions due to disruption of storage and marketing infrastructure. The relatively high adoption of storage technologies highlights the extension system's recognition of post-harvest management as an essential part of the wheat value chain. According to Yusuf and Bello (2021), post-harvest handling is critical in minimizing losses, stabilizing farmer incomes, and enhancing market competitiveness. The implication is that improved storage technologies not only safeguard farmer investment but also strengthen food supply chains in insurgency-affected areas.

The finding further shows that 44.1% of the respondents had access to modern irrigation techniques, ranking lowest among the technologies received. This low percentage implies that irrigation development remains under-emphasized despite its importance in sustaining wheat production in semi-arid environments like Borno State. Limited irrigation access may be attributed to infrastructural destruction by insurgency, lack of capital, or insufficient extension emphasis. Bello and Usman (2022) reported that inadequate irrigation infrastructure limits the capacity of smallholder farmers in Northeast Nigeria to adapt to erratic rainfall patterns and conflict disruptions. The implication is that without prioritizing irrigation development, wheat production will remain highly vulnerable to climate variability and insecurity.

Effectiveness of the Technologies Adopted by Wheat Farmers

The findings in Table 4 show that improved seed varieties, modern fertilizer application, and pest and disease control practices were rated effective by the farmers, with mean scores of 3.4, 3.4, and 3.3, respectively. This indicates that majority of respondents recognized these technologies as significantly improving their productivity and yield. The effectiveness of improved seed varieties implies that farmers benefited from higher germination rates, better adaptability, and increased yields compared to local varieties. This finding aligns with Garba *et al.* (2020), who reported that access to improved seed technologies was a major driver of wheat productivity in Northern Nigeria. The implication is that extension agents' emphasis on seed technology remains a strategic approach in enhancing food security, especially in insurgency-affected zones where productivity gaps are already high.



Table 4: Distribution of Respondents According to their Effectiveness of the Technologies Adopted from Extension Services

Variable	Mean	Decision
Improved seed varieties	3.4	Effective
Modern fertilizer application	3.4	Effective
Pest and disease control practices	3.3	Effective
Modern irrigation techniques	2.0	Not effective
Post-harvest handling and storage	3.2	Effective

Source: Field Survey, 2025 Mean threshold <3.0=Not effective ≥ 3.0 =Effective

Similarly, modern fertilizer application was perceived as effective with mean score of ($\bar{X}=3.4$), underscoring the importance of nutrient management in boosting wheat output. Fertilizer use is particularly crucial in regions where soil fertility is depleted due to continuous cropping and limited fallow periods. The effectiveness of fertilizer application suggests that farmers not only had access but were also able to apply the right type and dosage recommended by extension agents. This supports the findings of Sadiq *et al.* (2021), who emphasized that proper fertilizer management significantly improves both yield and profitability of cereals in Nigeria. The implication is that continuous training on balanced fertilizer use could sustain soil health while maximizing yields in insurgency-prone areas.

Pest and disease control practices also scored highly effective ($\bar{X}=3.3$). This indicates that farmers found extension-delivered pest and disease management techniques practical and beneficial in minimizing crop damage. Considering that insurgency often disrupts supply chains for pesticides and extension services, the relatively high effectiveness score demonstrates resilience and adaptability among farmers. This finding resonates with Ibrahim and Musa (2021), who highlighted that integrated pest management (IPM) techniques promoted by extension agents were critical in maintaining crop productivity in conflict-affected regions. The implication is that extension systems should continue to emphasize pest management strategies that are cost-effective and environmentally sustainable. Post-harvest handling and storage practices were also rated effective ($\bar{X}=3.2$). This is significant given that post-harvest losses account for a major share of production losses in Nigeria's cereal sector. Farmers' perception of these practices as effective indicates that extension services are addressing not only production but also value-chain sustainability. According to Yusuf and Garba (2019), effective post-harvest practices reduce losses, enhance grain quality, and improve market competitiveness. The implication here is that scaling up storage innovations will be crucial in improving income stability and resilience in insurgency-affected areas.

However, modern irrigation techniques were rated as not effective ($\bar{X}= 2.0$). This finding underscores a critical weakness in the extension system, as irrigation is vital for wheat production in the semi-arid zones of Borno State. The low effectiveness score may be due to infrastructural destruction from insurgency, high costs, or limited training on irrigation practices. Bello and Usman (2022) similarly reported that poor irrigation infrastructure was a major barrier to wheat intensification in Northeast Nigeria. The implication is that without strategic investments in irrigation, wheat farmers will continue to depend heavily on rainfall, making them highly vulnerable to climate variability and insecurity-related disruptions.

Factors Influencing Wheat Farmers' Access to Extension Services

Farmers access to extension service was regressed against a set of independent variables as depicted in Table 5. The sex (.069) was positive and statistically significant ($P<0.01$) factor influencing access to extension among respondents. The positive sign indicates that being male slightly increases the chance of accessing extension services and the odds ratio, male is having 8% higher chance of accessing extension services than the female farmers. This further suggests that male farmers had better access to extension services compared to female farmers. The majority of respondents in the study were male, which may explain this outcome, as extension services in many rural areas often target men as household heads. This finding is consistent with Olayemi *et al.* (2020), who noted that gender disparity continues to shape access to agricultural information in Nigeria, with women frequently excluded from formal extension networks. The implication is that extension



programs must deliberately design gender-inclusive strategies to ensure female wheat farmers are not left behind, especially in conflict-affected regions where their vulnerability is heightened.

Table 5: Factors Influencing Access to Extension among Respondents

Variables	B	Std. Error	Exp(B)	t	Sig.
(Constant)	2.473	0.047		52.923	0.000
Age	0.001	0.001	0.042	0.999	0.319
Sex	0.069	0.012	0.080	5.662	0.000***
Marital status	0.107	0.004	0.242	24.310	0.000***
Educational level	0.002	0.004	0.005	0.457	0.648
Household size	0.002	0.002	0.044	0.852	0.395
Farming experience	0.001	0.003	0.032	0.358	0.721
Farm size	0.005	0.011	0.023	0.447	0.655
Membership of association	0.156	0.018	0.209	8.422	0.000***
Years of membership	0.013	0.005	0.331	2.858	0.005***
Frequency of extension contact	0.215	0.002	1.046	91.653	0.000***
Access to credit	0.031	0.010	0.041	3.127	0.002***
Method of land acquisition	-0.008	0.003	-0.029	-2.474	0.014**
R-square	.994				
Adjusted R square	0.989				

***, ** Significant at ($P < 0.01$ and $P < 0.05$)

Marital status (.242) was positive and significant ($P < 0.01$) factor influencing access to extension among respondents, indicating that married farmers were more likely to access extension services than their unmarried counterparts. This is possibly because married farmers tend to have more established farms and social networks, making them more visible to extension agents. This aligns with Ibrahim *et al.* (2021), who found that married farmers generally enjoy higher social recognition, which influences participation in farmer groups and access to services. The implication is that unmarried and widowed farmers may face exclusion, and policies should ensure inclusivity across all marital categories.

Membership of association (.209) was positive and significant ($P < 0.01$) factor influencing access to extension among respondents, and years of membership (.331) was also positive and significant ($P < 0.01$) factor influencing access to extension among respondents. This shows that farmers who belonged to cooperatives or farmer groups had better opportunities to interact with extension agents. Cooperative membership enhances collective bargaining, group training, and easier dissemination of information. This agrees with the findings of Adamu *et al.* (2020), who emphasized that farmer organizations serve as critical platforms for accessing extension and agricultural innovations. The implication is that strengthening cooperatives can help mitigate insurgency-related disruptions by serving as contact points between agents and farmers.

The results also revealed that frequency of extension contact (1.046) was also positive and significant ($P < 0.01$) factor influencing access to extension among respondents, indicating that reduced frequency of interaction significantly constrained farmers' access. The ongoing insurgency likely restricted mobility of extension workers, thereby limiting visits to farming communities. This is in line with Akinwale *et al.* (2019), who observed that extension frequency is a strong predictor of technology adoption and sustained productivity. The implication is that alternative delivery methods such as mobile phones, radio, and community-based extension workers are needed to maintain frequent contact despite security challenges.

Furthermore, access to credit (.041) was positive and significant ($P < 0.01$) factor influencing access to extension among respondents, suggesting that farmers with better access to financial resources had greater opportunities to benefit from extension services. Access to credit often improves farmers' ability to adopt recommended practices, since financial constraints are reduced. This corroborates findings by Ndiritu *et al.* (2020), who emphasized that credit access enhances both technology adoption and extension participation. The implication is that integrating financial services



with extension delivery could significantly improve farmers' resilience in insurgency-affected areas. The finding also shows that method of land acquisition (-2.474) negative and significant ($P < 0.05$) factor influencing access to extension services among respondents. This finding implies that increase methods or access to land especially large farm size accessibility decreases respondents access and willingness to listen, adopt and utilize information from extension agents. Other variables such as age, educational level, household size, farming experience, and farm size were not significant, implying that they did not independently determine access to extension services in this context. This suggests that institutional and social factors (membership, credit, and contact frequency) play a greater role than individual characteristics.

CONCLUSION AND RECOMMENDATIONS

The study assessed how effective agricultural extension service delivery has been for wheat-producing farmers living under insurgency conditions in Southern Borno. Findings revealed that although farmers have relatively adequate access to some extension technologies especially improved seeds, fertilizer application, pest and disease management, and post-harvest handling—the effectiveness of extension delivery is critically weakened by insecurity. The insurgency has disrupted mobility, reduced extension contact frequency, damaged infrastructure, and limited access to key production technologies such as irrigation.

Based on the findings, the following recommendations were made:

- i. Government and development agencies should deploy community-based extension workers, operate through safe zones, and integrate ICT-based advisory services to ensure continuity of extension services under insecurity.
- ii. Cooperatives significantly improved access to extension services; therefore, supporting their formation, training, and formalization will boost information flow and collective action among farmers.
- iii. Extension visits should be supplemented with radio programs, audio-visual materials, and digital platforms to maintain regular interaction even when physical mobility is restricted by insurgency.
- iv. Financial institutions and government programs should expand credit availability, particularly using group-based or cooperative-based guarantee systems, enabling farmers to adopt recommended technologies.

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