



## ASSESSMENT OF ADOPTION OF GOOD AGRICULTURAL PRACTICES AMONG ARABLE CROP FARMERS IN BORNO STATE, NIGERIA

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### ABSTRACT

The study examined adoption of Good Agricultural Practices (GAPs) and arable crop cultivation in Borno State, Nigeria, using a multistage sample of 390 farmers. Data were collected from structured questionnaires and analysed with descriptive statistics and logit regression. Results shows that 73.85% of respondents were male, 76.15% married, and 36.15% had tertiary education. The mean age was 43 years, average household size 8, and farm size 3.31 ha. Major cultivated crops were maize (82.56%), bambara nut (76.15%), and groundnut (73.07%). Common GAPs adopted included fertilizer application (80.97%), seed treatment (65.91%), and recommended spacing (64.77%). Logit analysis reveals that farm size, cooperative membership, and access to credit as significant determinants of GAPs adoption. Key constraints to adoption of GAPs were inadequate inputs (78.46%), insecurity (74.62%), poor storage (73.08%), and insurgency (73.08%). The study provides a comprehensive assessment of the socio-economic characteristics, production patterns, adoption of Good Agricultural Practices (GAPs), and the major constraints faced by arable crop farmers in Borno State. Results show that arable crop production is largely male-dominated, with most farmers being married, relatively educated, and operating within medium-sized households that support labor needs. Despite their active involvement in farming, access to key productive resources—particularly credit and extension services—remains markedly low, limiting their capacity to innovate and adopt improved practices. Farmers cultivate a diverse range of arable crops, with maize, Bambara nut, groundnut, and sesame emerging as the most dominant. Adoption of GAPs was moderate to high across several practices, especially fertilizer application, seed treatment, recommended spacing, improved storage, timely land preparation, and clean weeding. Recommendation; Since credit significantly enhances GAP adoption, government, microfinance institutions, and NGOs should establish low-interest, collateral-free credit schemes, strengthen group lending, and integrate financial literacy training to empower farmers to invest in improved technologies. Ensure Adequate and Timely Supply of Agricultural Inputs

**Keywords:** Adoption, Agriculture, Crop, Farmers, Practices.

### INTRODUCTION

Agricultural development in Nigeria aims to shift farming from low-productivity subsistence systems to a high-productivity, agro-industrial economy through improved technologies (Nkwuagba & Nkamnebe, 2024). Since most of the rural poor depend on crop farming for livelihoods (Mathew, 2024), Good Agricultural Practices (GAPs) are promoted to enhance productivity, efficiency, and income. GAPs replace traditional methods with sustainable techniques, supporting both profitability and environmental protection (Abiodun, 2016). Introduced by FAO, GAPs ensure higher-quality products, improved food security, and market access (FAO, 2021). By improving farm management, yields, storage, and handling, GAPs reduce post-harvest losses and stabilize incomes (Adetarani *et al.*, 2021). Adoption also assures buyers of food safety, especially in private-sector-led supply chains. FAO's framework for Nigeria includes soil, water, crop and animal production, crop protection, post-harvest management, waste management, human welfare, and biodiversity conservation (Omolehin, Adebayo, & Yusuf, 2019). However, constraints such as land degradation, pests, low technology adoption, poor tools, limited credit, and weak market linkages persist (Bedru, Nwakuba, & Gana, 2022; Onoja, 2023; Adetarani *et al.*, 2021). Government and donor programs—such as Fadama, FAO initiatives, N2Africa, and BOSAP promote GAPs through climate-smart practices, improved varieties,



fertilization, and post-harvest technologies (Borno State Government, 2016). Yet, empirical evidence on GAPs adoption in Borno State remains limited. This study therefore assessed adoption of GAPs among Arable Farmers. The specific objectives were to:

- i. describe the socio-economic characteristics of the farmers;
- ii. identify the most cultivated arable crop cultivated by the farmers;
- iii. assess the most adopted Good Agricultural Practices among farmers (GAPs);
- iv. determine the socio-economic factors influencing the level of adoption of Good Agricultural Practices; and
- v. identify constraints to the adoption of Good Agricultural Practices.

## METHODOLOGY

### The Study Area

This study was carried out in Borno State, which is located between latitude 12°08'60.00" N and longitude 12°53'59.99" E. The State covers a total land area of approximately 61,435 square kilometers. Shares borders with Republic of Niger to the north, Republic of Chad to the northeast and Cameroon Republic to the east. It also shares borders with Adamawa State to the south, Gombe State to the southwest and Yobe State to the West (Figure 1). The state comprised of 27 local Government Areas (LGA). The population of Borno State from 2006 census was 4,171,104 and the projected population of Borno State at 2025 is 7,171,104 with an annual growth rate of 3 percent (National Population Commission, NPC, 2021). Majority of the people are farmers and Agriculture is the mainstay of the economy of the State. The annual rainfall ranges from 600 mm in the north to 1200 mm in the south and extends over a growing season of between 100 and 180 days. Annual rainfall varies from year to year, with decreasing trends during the past two decades. The temperature ranges from 13.6 °C to 31.9 °C in January and 9.0 °C to 28.5 °C in August (Quick projects, 2018).

### Sampling Technique and Sampling Size

Borno State has (3) three Agricultural zones namely; (Zone 1, Zone 2 and Zone 3). Each of the Agricultural zone comprises of (9) nine LGAs ~~local government areas~~. Multi-stage sampling technique was adopted for the study. The first stage involved purposive selection of ~~(3) three~~ (3) LGAs ~~local government areas~~ from each zone based on the intensity of agricultural production which were Zone 1; Biu, Kwaya Kusar and Bayo; ~~were selected in zone 1~~, in zone 2; Bama, Konduga and Jere, and in zone 3; Magumeri, Nganzai and Monguno giving a total of 9 LGAs. The Second stage involved proportionate selection of 131 Agricultural blocks and 119 extension cells. In the third stage, the list of the 15,450 registered farmers was obtained from BOSADP which was used as a sampling frame. From the list, farmers were randomly and from the registered farmers from each of the selected extension cells. A total of 410 farmers were selected using Yamane (1969) formula.

Thus,

$$n = \frac{N}{1 + N(e)^2} \quad \dots(1)$$

$$n=390$$

n= Sample size

N= the finite population of crop farmers

l= constant

e = margin error

$$n = \frac{15450}{1 + 15450(0.05)^2}$$

$$n=390$$

Thus, the required sample size is 390, the sample size is adjusted by 5 percent to 410 because some of the entries were invalid. In the last stage, the sample size is distributed proportionally to all the selected Local Governments in the study area based on the registered farmers' population size.

**Table 1: Sampling Size Selection Plan**

S/N	L.G. A	Extension Blocks	Extension Block Selected	Extension Cells	Extension Cells Selected	Registered Farmers	Farmers Selected
1.	Biu	16	11	30	15	2900	77
2.	Bayo	10	7	12	9	1100	29
3.	KwayaKusar	13	9	16	10	1400	37
4.	Bama	80	54	28	14	1500	40
5.	Konduga	11	8	16	9	1000	27
6.	Jere	14	10	12	8	1600	42
7.	Magumeri	15	11	20	13	2000	53
8.	Nganzai	12	10	12	9	1000	27
9.	Monguno	16	11	25	14	2950	78
<b>Total</b>	<b>9</b>	<b>187</b>	<b>131</b>	<b>171</b>	<b>119</b>	<b>15450</b>	<b>410</b>

**Source:** Field Survey, 2023

### Methods of Data Analysis

Descriptive statistics and inferential statistics were used in the analysis of data collected for this study. Descriptive statistics in the form of frequencies, mean and percentage were used to achieve objectives (i, ii, iii, iv, v and vii). A five-point Likert scale (was used to further determine objective v) of the mean score in the determination of the mean score to determine the level of adoption of GAPs:  $5+4+3+2+1= 15/5= 3$  ... (2)

The mean value of the scale of 3 and was used as the cutoff point to rank the responses. Any mean response of  $\geq 3$  is considered high adopter, while a mean score of  $\leq 2$  is considered a low adopter. Inferential statistics in the form of binary logit regression was used to achieve objective (vi) which is the socio-economic factors influencing the level of adoption of Good Agricultural Practices (GAPs). Logistics regression was used to measure the influence of socio-economic institutional factors on level of adoption of GAPs among farmers. Ochieng *et al.* (2017) used binary logit regression to analyze the level of adoption of GAPs in Kenya. The model is stated thus:

$$\text{Log} (Y_i) = \text{Ln} \left[ \frac{p_i}{1-p_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e \quad \dots (3)$$

$$Y_i = \begin{cases} 1 & \text{if the } i^{\text{th}} \text{ farmer is High Adopter*} \\ 0 & \text{if the } i^{\text{th}} \text{ farmer is Low Adopter} \end{cases}$$

\*If an  $i^{\text{th}}$  farmer's mean score in the level of adoption of GAP is 3 and above, s/he is considered a high adopter and but if the mean score is less than 3, the farmer is considered a low adopter.

Where:

$Y_i = ?$

$X_1$  = Sex (1=Male, 0=Female)

$X_2$  = Education (Number of years spent in formal education)

$X_3$  = Farm size (hectares)

$X_4$  = Membership of Farmer Cooperative (1=Yes, No =0)

$X_5$  = Access to credit (1=Yes, 0=No)

$X_6$  = Access to Extension contact (1=Yes, 0=No)

## RESULT AND DISCUSSIONS

### Socio- economic Characteristics of the Respondents

The result of the study shows that arable crop production in Borno State is male-dominated, with men constituting 73.85% of respondents. This aligns with Okon and Enete (2022), who reported 60% male dominance in southeastern Nigeria, but contrasts with Nwaiju (2015), who found female dominance in the same region, reflecting socio-cultural and religious influences. Women still contribute to food security through weeding, harvesting, and marketing (Chisenga, 2015). Onya *et al.*



(2019) also observed 55% male predominance in land access, tied to patriarchal systems. Marital status was notable, with 76.15% married, suggesting farming is household-driven (Adebayo *et al.*, 2021; Ibidapo *et al.*, 2018). Education was relatively high, with 36.15% and 32.82% attaining tertiary and secondary education, potentially enhancing innovation adoption, unlike lower literacy levels in northern Nigeria (Alabi & Adams, 2020). Education influences agricultural and economic decisions (Ibidapo *et al.*, 2018), though levels differ regionally (Onya *et al.*, 2019; Umeh & Igwe, 2019; Adam *et al.*, 2022). Cooperative membership supports access to inputs, credit, and information, boosting productivity (Yusuf *et al.*, 2021; Mengistu, 2024). However, 72.82% lacked credit access, higher than in southwestern Nigeria (Olagunju & Ayanwale, 2019). Credit drives technology adoption and productivity (Afolabi, 2010; Ololade & Olagunju, 2013; Oboh & Kushwaha, 2009; Philip, 2013). Extension services were scarce (6.41%), unlike Ghana where 77% of tomato farmers had access (Akomdo *et al.*, 2023), despite extension's innovation role (Oluwatayo & Oluwaseyo, 2024). Land access also shaped production, with 38.46% hiring land, showing tenure insecurity (Fasona *et al.*, 2020). Inheritance remains key in states like Borno and Kebbi (Idowu, 2021; Ibrahim & Nabage, 2023)

**Table 2:** Distribution of Respondents based on Socio-economic Factors (n=410)

Gender	Frequency	Percentage
Male	102	73.85
Female	288	26.15
<b>Marital status</b>		
Divorced	25	6.41
Married	297	76.15
Single	68	17.44
<b>Level of Education</b>		
Non-formal	80	20.51
Primary	41	10.51
Secondary	128	32.82
Tertiary	141	36.15
<b>Membership of Cooperatives</b>		
No	184	47.18
Yes	206	52.82
<b>Access to credit</b>		
No	284	72.82
Yes	106	27.18
Total	390	100
<b>Access to extension services</b>		
No	365	93.59
Yes	25	6.41
<b>System of land ownership</b>		
Family	137	35.13
Hired	150	38.46
None	1	0.26
Others	20	5.13
Personal	82	21.03

**Source:** Field Survey (2023)

### Descriptive Statistics of Some Socio-economic Continuous Variables

The mean age of arable crop farmers in Borno State was 43 years (SD = 12.78), reflecting a mature and active farming population. This is consistent with Adebo and Sekumade (2019), who reported 45 years in southwestern Nigeria, and Kundiri *et al.* (2022) among cassava farmers in Jigawa. Farmers in this bracket combine physical strength with farming experience. Average household size was 8.1 (SD = 5.92), providing family labor for farm operations, similar to findings by Oladeji *et al.* (2020) in North-Central Nigeria and Ibrahim *et al.* (2023) in Borno. While large households support labor needs, they also raise dependency pressures. Farm size averaged 3.31 ha (SD = 2.02), typical of subsistence systems in Nigeria. Comparable results were reported by Onyekuru and Marchant (2021)



with 2.5 ha in southeastern Nigeria. Kolapoa *et al.* (2023) noted that larger farms enhance adoption of conservation practices through greater land-use flexibility. Mean annual income was ₦1,176,219 (SD = ₦1,438,386), ranging from ₦10,000 to ₦9,000,000, indicating wide disparities. Oseni and Winters (2021) found a lower average of ₦850,000 in the Middle Belt. Higher incomes may stem from crop choices and market access, while limited inputs, extension, and credit constrain others.

**Table 3:** Quantitative socioeconomic-economic Variables

Variables	Mean	Std	Minimum	Maximum
Age	43.015	12.778	19	80
Household Size	8.104	5.92	1	34
Farm size	3.314	2.02	0.45	10
Average Annual income	1176219	1438386	10,000	9,000,000

**Source:** Field Survey (2023)

### Most Cultivated Arable Crops Cultivated by the Respondents

Table 4.2 shows that respondents cultivated 15 arable crops. The leading crops were maize (82.56%), Bambara nut (76.15%), groundnut (73.07%), and sesame (70.76%), ranked 1st to 4th. Tomato, sorghum, and millet followed, each at 70.05% (5th). These results confirm maize as the most dominant cereal in Borno State, while Bambara nut and groundnut are the major legumes, and sesame an important oilseed. Their wide acceptance reflects favorable cultural preferences and agro-climatic conditions. Rice (67.94%), soybean (67.43%), cowpea (65.64%), and onion (62.82%) ranked 6th to 9th, with maize still the most prominent. Other crops included sweet melon (62.56%), okra (40.00%), sweet potato (31.53%), miscellaneous crops (9.48%), and cocoyam (4.35%). The strong preference for maize over rice may be linked to consumption patterns and adaptability. Similar findings were reported by Mudi *et al.* (2019) in Southern Borno and by Tahir *et al.* (2020), who also identified maize, sorghum, groundnut, cowpea, pepper, and onion as widely cultivated.

**Table 4:** Distribution of Respondents based on Most Cultivated Arable Crops (n=410)

Arable Crops	*Frequency	Percentage	Rank
Maize	322	82.56	1 <sup>st</sup>
Bambara nut	297	76.15	2 <sup>nd</sup>
Ground nut	285	73.07	3 <sup>rd</sup>
Sesame	276	70.76	4 <sup>th</sup>
Tomatoes	273	70.00	5 <sup>th</sup>
Sorghum	273	70.00	5 <sup>th</sup>
Millet	273	70.00	5 <sup>th</sup>
Rice	265	67.94	6 <sup>th</sup>
Soybean	263	67.43	7 <sup>th</sup>
Cowpea	256	65.64	8 <sup>th</sup>
Onion	245	62.82	9 <sup>th</sup>
Sweet Melon	244	62.56	10 <sup>th</sup>
Okra	156	40.00	11 <sup>th</sup>
Sweet potatoes	123	31.53	13 <sup>th</sup>
Cocoyam	17	4.35	14 <sup>th</sup>

**Source:** field Survey. 2023 \*Multiple responses

### Most Adopted Good Agricultural Practices (GAPs)

Table 4 highlights the most adopted GAPs among arable crop farmers in Borno State. Fertilizer application had the highest adoption rate (80.97%), reflecting its vital role in soil fertility and yield improvement (Abdoulaye & Sanders, 2005; Morris *et al.*, 2007). Seed treatment was adopted by 65.91% of respondents, essential for protecting seeds from pests and enhancing germination (Ojiako *et al.*, 2007; Bennett *et al.*, 2012). Intra- and inter-row spacing (64.77%) promotes optimal resource use and reduces disease spread (FAO, 2010; Tilman *et al.*, 2002). Improved storage methods (63.35%) help minimize post-harvest losses (Kader, 2005; World Bank,





2011). Timely land preparation (61.08%) supports better soil and water management (Erenstein *et al.*, 2006), while clean and timely weeding (60.23%) prevents competition for nutrients, improving yields (Zimdahl, 2013; Swanton & Murphy, 1996). Overall, these practices align with sustainable agriculture goals and enhance crop productivity.

**Table 5:** Distribution of respondents based on most of the Adopted Good Agricultural Practiced

Most Adopted GAPs	Frequency*	Percentage
Fertilizer for Planting	285	80.97
Seed Treatment	232	65.91
Intra and Inter Row Recommended Spacing	228	64.77
Improved Storage Method	223	63.35
Timely Land Preparation	215	61.08
Timely and Clean weeding	212	60.23

**Source:** Field Survey (2023) \* Multiple response exists

### Socio-economic Factors Influencing Level of Adoption of (GAPs)

The logistic regression analysis ( $LR \chi^2 = 21.61$ ,  $p = 0.0014$ ) shows that the model significantly explains variation in GAP adoption. Low multicollinearity ( $VIF = 1.24$ ) and a non-significant hatsq statistic ( $p = 0.493$ ) indicate robustness. Access to credit positively influences GAP adoption, consistent with findings that financial capital enables investments in improved technologies (Afolabi, 2020; Nwaru *et al.*, 2018; Akudugu *et al.*, 2019; Feder *et al.*, 2017). Studies further confirm that credit enhances productivity and adoption of improved practices (Oyewole & Olagunju, 2024; Bolarinwa & Fakoya, 2016; Awotide *et al.*, 2017; Nuryartono *et al.*, 2015). Farm size negatively affects adoption ( $\beta = -0.125$ ,  $p < 0.05$ ), contrasting with literature linking larger farms to higher technology uptake (Feder, Just, & Zilberman, 2017). Cooperative membership also shows a negative effect, diverging from conventional expectations. Expanding access to affordable credit remains crucial for promoting GAP adoption and improving smallholder livelihoods.

**Table 6:** Socio-economic Factors Influencing Level of Adoption of GAPs

Variables	Coefficient	Standard error	z-value	Prob > z
Sex	-0.0238925	0.2944263	-0.08	0.935
Education	-0.0704216	0.3695659	-0.19	0.849
Farm Size	-0.1250464**	0.0606829	-2.06	0.039
Membership of Cooperatives	-0.9392567***	0.3042572	-3.09	0.002
Access to credit	1.240503***	0.3491348	3.55	0.000
Access to extension service	-0.1028168	0.292443	-0.35	0.725
Constant	1.873584	0.5216463	3.59	0.000
LR Chi2	21.61***			
Prob > Chi2	0.0014			
Mean VIF	1.24			
Hatsq	-0.1900711	0.2773972	-0.69	0.493
Pearson Chi2	108.90			
Prob > Chi2	0.3776			

Field Survey, 2023 \*\*\* Significant at 1% level \*\* Significant at 5% level, LR is Log likelihood

### Constraints to the Adoption of Good Agricultural Practices (GAPs)

Inadequate supply of inputs (78.46%) was the most reported constraint to Good Agricultural Practices (GAPs) adoption, consistent with Meijer *et al.* (2015) and Adesina and Oluwatayo (2024), who stressed limited access to inputs as a major barrier. Other key challenges include lack of time and insecurity (74.62%) and poor storage facilities (73.08%), which restrict access to training, extension, and post-harvest management (Meijer *et al.*, 2015; Oyelede & Afanlayon, 2024; Affognon *et al.*, 2015). Additional barriers such as lack of interest (71.54%), local politics (71.03%), risk perception, poor information (69.49%), and climate change (69.23%) discourage adoption (Feder *et al.*, 1985; Usman & Mohammed, 2024). Issues like technological incompatibility, late input distribution, poor



education, language barriers, and lack of tools also play a role (Rogers, 2003; Ojo & Oladele, 2023; Alabi & Akinbode, 2024). Limited capital (40.26%) further constrains investment in improved practices (Owusu & Mensa, 2024).

**Table 7:** Distribution of Respondents based on Constraints to the Adoption of Good Agricultural Practices

Constraints	Frequency*	Percentage	Rank
Inadequate supply of inputs	306	78.46	1 <sup>st</sup>
Lack of time to attend training and meetings	291	74.62	2 <sup>nd</sup>
Insecurity problems	291	74.62	2 <sup>nd</sup>
Poor storage facilities	285	73.08	3 <sup>rd</sup>
Insurgency	285	73.08	3 <sup>rd</sup>
Lack of interest to adoption in GAPs	279	71.54	4 <sup>th</sup>
Local politics	277	71.03	5 <sup>th</sup>
Fear of risk or uncertainty	277	71.03	5 <sup>th</sup>
Poor/ inadequate information	271	69.49	6 <sup>th</sup>
Climate change	270	69.23	7 <sup>th</sup>
Lack of incentives	269	68.97	8 <sup>th</sup>
Incompatibility of GAPs technologies	268	68.72	9 <sup>th</sup>
Late distribution of inputs	263	67.44	10 <sup>th</sup>
Difficulty of accessing technical information	255	65.38	11 <sup>th</sup>
Language barrier	248	63.59	12 <sup>th</sup>
Illiteracy and poor education	246	63.08	13 <sup>th</sup>
Lack of farming equipment for land preparation	242	62.05	14 <sup>th</sup>
Lackadaisical attitudes of farmers and trainers	216	55.38	15 <sup>th</sup>
Late dissemination of technical information	169	43.33	16 <sup>th</sup>
Inadequate financial institutions / Capital	157	40.26	17 <sup>th</sup>

**Source:** Field survey: 2023 \* Multiple Response

## CONCLUSION AND RECOMMENDATION

The study provides a comprehensive assessment of the socio-economic characteristics, production patterns, adoption of Good Agricultural Practices (GAPs), and the major constraints faced by arable crop farmers in Borno State. Results show that arable crop production is largely male-dominated, with most farmers being married, relatively educated, and operating within medium-sized households that support labor needs. Despite their active involvement in farming, access to key productive resources—particularly credit and extension services—remains markedly low, limiting their capacity to innovate and adopt improved practices. Farmers cultivate a diverse range of arable crops, with maize, Bambara nut, groundnut, and sesame emerging as the most dominant. Adoption of GAPs was moderate to high across several practices, especially fertilizer application, seed treatment, recommended spacing, improved storage, timely land preparation, and clean weeding. These practices reflect farmers' recognition of the need to enhance productivity and reduce post-harvest losses. However, socio-economic factors significantly influenced GAP adoption. Access to credit emerged as a strong positive driver, reaffirming the critical role of financial inclusion in agricultural transformation. Conversely, farm size and cooperative membership had negative and significant effects on adoption, indicating structural inefficiencies and possible constraints within existing support systems. The regression model demonstrated strong explanatory power and robustness. Constraints to GAP adoption were widespread and multifaceted. Inadequate supply of inputs, insecurity, lack of time, poor storage facilities, local politics, risk perception, and poor access to information were among the most critical challenges. These constraints collectively reduce farmers' capacity to adopt innovations and improve productivity. Structural issues, including late input distribution, language barriers, low literacy, and insufficient technical support, further exacerbate the adoption gap. Overall, the findings underscore the need for targeted interventions that strengthen input supply systems, expand affordable credit, improve extension delivery, and secure farming



environments. Addressing these challenges will enhance the adoption of GAPs, improve productivity, and support resilient livelihood strategies among arable crop farmers in Borno State. Based on the findings of this study, the following recommendations are made'

- i. Since credit significantly enhances GAP adoption, government, microfinance institutions, and NGOs should establish low-interest, collateral-free credit schemes, strengthen group lending, and integrate financial literacy training to empower farmers to invest in improved technologies.
- ii. Ensure Adequate and Timely Supply of Agricultural Inputs
- iii. To address the most critical constraint (78.46%), input distribution systems should be reformed to guarantee consistent, timely, and affordable access to certified seeds, fertilizers, and GAP-related technologies, supported through strong public–private partnerships.
- iv. Strengthen and Modernize Agricultural Extension Services
- v. With only 6.41% access to extension, the state should recruit more agents, equip them with ICT tools, and implement digital and community-based extension platforms (radio, SMS, WhatsApp) to ensure continuous delivery of GAP training despite insecurity.
- vi. Improve Rural Security to Safeguard Farming Activities
- vii. Given the severe impact of insecurity and insurgency (74.62%), government and communities should intensify security patrols, farming cluster protection, and early-warning systems, ensuring farmers can safely access farmlands, markets, and extension activities.

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