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CLIMATE SMART AGRICULTURAL PRACTICES AS IT AFFECTS THE LIVELIHOOD OF FARMERS IN SOME SELECTED LOCAL GOVERNMENT AREAS OF YOBE STATE, NIGERIA

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ABSTRACT

This study examines the impact of Climate-Smart Agricultural Practices (CSAPs) on the livelihoods of farmers in Damaturu, Geidam and Gujba Local Government Areas of Yobe State, Nigeria. A mixed-method approach, including surveys, interviews and focus group discussions, was employed to assess the relationship between CSAP adoption, farmers' demographic characteristics and livelihood outcomes. Results revealed that, majority of respondents were within the productive age group of 45–54 years (55.13%), predominantly male (94.87%) and with relatively high education levels, as 61.54% attained tertiary education. Sensitization programs proved effective, with over 97% of farmers acknowledging improved understanding of climate change and food security linkages (M = 4.47–4.49). Respondents strongly agreed that CSAPs enhanced food production (M = 4.37), improved food security (M = 4.24) and contributed to reducing insurgency through youth engagement (M = 4.27). However, major constraints were identified, including financial limitations (M = 4.35), lack of sufficient knowledge (M = 4.40), limited access to resources (M = 4.28) and inadequate policy support (M = 4.44). Overall, the findings demonstrate that CSAP adoption positively influences agricultural productivity, income and resilience to climate shocks, though overcoming systemic barriers remains critical for large-scale implementation.

Keywords: Climate-Smart Agriculture, livelihoods, food security, Yobe State, Nigeria

INTRODUCTION

Agriculture plays a central role in eradicating hunger, reducing poverty and combating climate change. In developing countries like Nigeria, climate change has become a major barrier to agricultural growth due to its effects on rainfall variability, droughts, soil degradation and reduced crop yields. In Yobe State, where over 70% of the population depends on agriculture, livelihoods are increasingly threatened by desertification, reduced precipitation and extreme weather conditions. These challenges make the adoption of innovative and sustainable practices crucial. Climate-Smart Agriculture (CSA) offers an integrated solution by focusing on productivity, adaptation, and mitigation. It aims to enhance yields, build resilience and reduce greenhouse gas emissions while supporting food security and socio-economic development. Practices such as intercropping, agroforestry, conservation agriculture, soil conservation and the use of drought-tolerant varieties have shown promise in addressing climate-induced vulnerabilities. For farmers in Yobe State, CSA is vital to withstand shocks, improve incomes and strengthen community resilience. This study therefore investigates the adoption and impact of CSA practices on the livelihoods of farmers in selected local government areas of Yobe State.

MATERIALS AND METHODS

This study was designed to provide scientific insights that could accelerate the adaptive capacities of rural communities and farmers in five local government areas (LGAs) of Yobe State, namely Damaturu, Geidam, Gujba, Fune and Potiskum. A set of agronomic practices was identified to suit the agro-ecology of the study area, with the aim of enhancing food security and agricultural productivity. The study was carried out over a period of six months across rural communities characterized by hot, humid tropical climatic conditions. Agriculture was the main

occupation of the population, with about 80% engaged in small-scale crop farming, often relying on traditional practices.

The research engaged farming communities through awareness campaigns and directly involved participants in training on various aspects of Climate-Smart Agriculture (CSA). A total of one hundred (100) questionnaires were randomly administered in each of the selected LGAs. For respondents who were unable to read or write, structured oral interviews were conducted to capture their perspectives. In addition, focus group discussions were held with community members to encourage shared insights and collective reflections. Key Informant Interviews (KIIs) were also conducted with local leaders, extension workers and knowledgeable stakeholders to validate findings. Both primary and secondary data sources were utilized. Primary data were collected through field surveys, direct observations, interviews, focus group discussions and key informant interactions. Secondary data were drawn from relevant literature, government reports and institutional records to complement and contextualize the field findings.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents: The demographic analysis revealed that most respondents (55.13%) were within the productive age group of 45–54 years, while 16.67% were above 54 years. Male farmers dominated the sample (94.87%) and the majority were married (97.44%). Education levels were relatively high, with 61.54% having attained tertiary education, followed by 16.67% with secondary education and 14.10% with primary education. Farming experience was substantial, with 48.72% having practiced for over 20 years. This demographic profile indicates that the respondents were mature, literate and experienced, aligning with studies that emphasize the importance of education and farming experience in enhancing the adoption of improved agricultural technologies [1,2].

Farmers' Awareness and Perceptions of Climate Change: Awareness campaigns and sensitization programs played a critical role in improving knowledge about the relationship between climate change and food security. More than 97% of respondents agreed that these sessions enhanced their understanding, while a mean score of 4.32 indicated empowerment to adopt sustainable practices. This finding is consistent with the assertion that awareness is a significant driver of climate adaptation strategies among Nigerian farmers [3]. The high level of agreement also reflects the growing recognition that effective knowledge dissemination improves resilience and promotes sustainable agricultural transitions [4].

Impacts of Climate-Smart Agricultural Practices: The adoption of CSAPs was positively associated with agricultural and social benefits. Farmers indicated that CSA improved food production (M = 3.97), enhanced food security (M = 4.24) and increased yields (M = 4.37). These outcomes are in line with previous findings that climate-smart interventions, such as conservation agriculture and improved crop varieties, significantly enhance productivity and incomes [5,6]. Importantly, youth involvement in CSA activities contributed to reducing insurgency and improving community stability (M = 4.27), showing the broader socio-economic impact of these practices. This reflects the view that CSAPs not only address productivity but also promote social resilience by engaging vulnerable groups [7].

Perceptions of Current Agricultural Practices: Farmers moderately agreed that their current agricultural practices addressed climate concerns (M = 3.86) and showed resilience to climate impacts (M = 3.85). However, understanding of vulnerabilities and awareness of adaptation needs remained limited (M = 3.62–3.69). Respondents emphasized the need for stronger institutional support, as government and NGO engagement was perceived as inconsistent (M = 3.67). These results align with observations that without institutional backing, farmers' adaptive capacity remains limited despite awareness of climate challenges [8]. The moderate scores further suggest that while traditional practices contribute to resilience, they are insufficient to address the intensity of current climate risks, reinforcing the need for targeted interventions.

Constraints to Adoption of CSAPs: The study identified financial limitations, inadequate knowledge, limited access to resources and poor policy support as key barriers to adoption. Farmers strongly agreed that these constraints collectively hindered implementation, with the highest mean score (M = 4.64) reflecting widespread consensus. These findings support global literature highlighting financial and institutional constraints as major obstacles to CSA adoption [9,10]. Addressing these barriers requires a multi-dimensional approach, including subsidies, extension services and supportive policy frameworks. Without systemic changes in resource provision and institutional support, the benefits of climate-smart agriculture remain limited to small-scale or short-term impacts [11,12]. The findings of this study therefore highlight the urgent need for integrated interventions that combine technical, financial and policy solutions.

This study assesses the impact of Climate-Smart Agricultural Practices (CSAPs) on the livelihoods of farmers in Damaturu, Geidam and Gujba LGAs, Yobe State, Nigeria. It examines the relationship between CSAPs and key factors such as food security, climate resilience, poverty reduction and youth involvement. Utilizing both qualitative and quantitative methods, including surveys and focus group discussions, the study evaluates the extent of CSAP adoption and its outcomes. The findings reveal that CSAPs contribute positively to food production, enhance resilience to climate shocks and boost farmers' incomes. Demographic data show that most respondents are in their productive years (45-54), with a high literacy rate that supports the adoption of modern agricultural practices. However, the study highlights critical challenges, such as financial constraints, knowledge gaps, limited access to resources and insufficient policy support. Farmers demonstrate a strong awareness of climate change impacts and the importance of adopting CSAPs. These practices have significantly improved crop yields, strengthened food security and enhanced community resilience, reducing vulnerability to climate-related risks.

CONCLUSION

This study demonstrated that Climate-Smart Agricultural Practices (CSAPs) had a significant positive influence on the livelihoods of farmers in Damaturu, Geidam and Gujba LGAs of Yobe State. Adoption of CSAPs improved food production, enhanced food security, and contributed to community stability through youth engagement, thereby addressing both agricultural and social challenges. Farmers also showed strong awareness of climate change impacts, yet widespread adoption remained constrained by financial barriers, inadequate knowledge, limited access to resources, and weak policy

support. The findings suggest that CSAPs provide a transformative pathway for sustainable agricultural development and resilience in Yobe State, but their long-term success depends on removing systemic barriers through supportive policies, capacity building and improved resource accessibility. For CSAP adoption to be scaled and sustained, supportive policies and financial mechanisms are essential. Government and development partners should provide subsidies, credit facilities and incentives to ease financial burdens on smallholder farmers. Continuous education and training programs are critical to close knowledge gaps and extension services should be strengthened to provide technical support. Improving access to climate-resilient seeds, water management infrastructure and modern farming tools will further enhance productivity and resilience. Engaging youth in agriculture is key to reducing unemployment and strengthening social stability and this can be achieved through cooperative societies and farmer-led initiatives. Finally, effective monitoring and evaluation frameworks should be established to track progress, identify challenges and refine CSAP strategies to ensure their long-term sustainability.

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TABLES

Table 1: Demographic information of the respondents in Damaturu, Geidam and Gujba local government areas of Yobe State

Variables	Freq.	N = 78	Percentage (%)
Age			
25-34	2		2.60
35-44	20		25.60
45-54	43		55.13
55yrs and above	13		16.67
Gender			
Male	74		94.87
Female	4		5.13
Marital status			
Married	76		97.44
Single	2		2.56
Educational Level			
Primary	11		14.10
Secondary	13		16.67
Vocational/technical training	2		2.56
Tertiary	48		61.54
Others	4		5.13
Since when have you started farming			
Past 5yrs	8		10.26
Past 10yrs	17		21.79
Past 15yrs	7		8.97
Past 20yrs	38		48.72
others	8		10.26

N= Total number of respondents for the three local government areas in Yobe State

Table 2: Perception of linkages between food security and climate change in Damaturu, Geidam and Gujba local government areas

S/N	Statement	SA	A	U	D	SD	M	SDe
1	The information provided during the sensitization sessions helped me understand the connection between climate change and food security.	41	35	0	2	0	4.47	0.63
2	I believe that awareness about climate change is crucial for ensuring long-term food security in our community.	40	36	2	0	0	4.49	0.55
3	The sensitization sessions effectively communicated the specific challenges our community faces regarding climate change and its impact on food production.	35	42	1	0	0	4.44	0.52
4	I feel more empowered to adopt sustainable farming practices after attending the awareness sessions on the link between	29	46	2	1	0	4.32	0.59

	climate change and food security.							
5	I believe that implementing climate-smart agricultural techniques can enhance our community's resilience to the impacts of climate change on food production.	41	34	2	0	1	4.46	0.67

Table 3: Perception of linkages between climate smart agriculture, increase in food production, food security and reduction in malnutrition, poverty and insurgency

S/N	Statement	SA	A	U	D	SD	M	SDe
1	CSA initiatives have contributed to an increase in food production in our Local Government Area.	28	33	9	3	5	3.97	1.10
2	Involving youths in CSA activities has contributed to a decrease in insurgency and related issues in our Local Government Area.	34	37	4	0	3	4.27	0.87
3	I believe that the implementation of Climate-Smart Agriculture practices has positively impacted the quantity of crops produced.	36	39	1	0	2	4.37	0.75
4	I feel more secure about the availability of food in my community due to the implementation of CSA practices.	24	52	0	1	1	4.24	0.64
5	CSA has played a role in reducing the vulnerability of our community	21	37	11	3	6	3.82	1.11

SA=strongly agree, A= agree, U= undecided, D = disagree, SD = strongly disagree, M= mean and SD=standard deviation

Table 4: Perception of farmers to current agricultural practices and climate change in Damaturu, Geidam and Gujba local government areas

S/N	Statement	SA	A	U	D	SD	M	SDe
1	The current agricultural practices in the selected LGAs effectively address climate change concerns.	22	32	18	3	3	3.86	1.00
2	I believe that the existing agricultural practices in the selected LGAs are resilient to potential climate change impacts.	17	39	18	1	3	3.85	0.91
3	The identified vulnerabilities to climate change in the current agricultural practices are adequately understood by local farmers and stakeholders.	13	40	17	4	4	3.69	0.98
4	There is a sufficient level of awareness among farmers in the selected LGAs regarding the need to adapt their agricultural practices to climate change.	21	20	27	6	4	3.62	1.11

5	Government and non-governmental organizations are actively involved in supporting and promoting climate-resilient agricultural practices in the surveyed LGAs.	14	38	17	4	5	3..67	1.03

SA=strongly agree, A= agree, U= undecided, D = disagree, SD = strongly disagree, M= mean and SD=standard deviation

Table 5: Perception of farmers on the constrain and barriers faced in the adaptation of climate smart agriculture in Damaturu, Geidam and Gujba local government areas

S/N	Statement	SA	A	U	D	SD	M	SDe
1	"Farmers face significant financial constraints in adopting Climate Smart Agricultural Practices."	42	27	4	4	1	4.35	0.89
2	"There is a lack of sufficient knowledge among farmers regarding Climate Smart Agricultural Practices."	39	33	4	2	0	4.40	0.70
3	"Farmers have limited access to essential resources required for implementing Climate Smart Agricultural Practices."	42	25	4	5	2	4.28	1.00
4	"There is inadequate policy support for farmers to successfully adopt and implement Climate Smart Agricultural Practices."	47	23	5	1	2	4.44	0.87
5	"Farmers encounter various barriers, including	57	17	2	1	1	4.64	0.72

	financial constraints, lack of knowledge, limited access to resources, and insufficient policy support, hindering the widespread adoption of Climate Smart Agricultural Practices."							

SA=strongly agree, A= agree, U= undecided, D = disagree, SD = strongly disagree, M= mean and SD=standard deviation