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Assessing the Levels of Farmers' Awareness and Adoption of Organic Crop Farming in Selected States of Northeastern Nigeria

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Abstract

This study assessed the awareness and adoption of organic crop farming practices among farmers in Bauchi, Gombe, and Yobe States in Northeastern Nigeria. Despite the well-documented benefits of organic farming for food security, environmental conservation, and improved livelihoods, its adoption in the region remains limited. Using a cross-sectional survey design, a total of 1,500 farmers were randomly selected from 30 enumeration areas across the three states. Data were collected using a structured questionnaire and analyzed using descriptive statistics in SPSS. The findings reveal that while a significant portion of farmers have a basic awareness of organic practices, such as the use of organic fertilizers, intercropping, and crop rotation, their knowledge of more advanced techniques like composting, reduced tillage, and green manuring is minimal. Furthermore, the study identified a critically low awareness among farmers regarding the nutritional, economic, and environmental benefits of organic farming. The results highlight a clear gap between basic awareness and a comprehensive understanding of the full potential of organic agriculture. The study concludes that a lack of adequate knowledge, particularly concerning the benefits and advanced techniques, is a major barrier to the widespread adoption of organic farming in the region. The findings provide valuable insights for policymakers and extension agents to design targeted awareness campaigns and training programs. By bridging this knowledge gap, it is possible to promote sustainable agricultural practices, enhance food security, and improve the economic well-being of rural communities in Northeastern Nigeria.

Keywords: Organic Crop Farming, Farmer Awareness, Adoption of Practices, Northeastern Nigeria, Sustainable Agriculture

Introduction

Agriculture remains the backbone of the Nigerian economy, providing employment and contributing significantly to food security and rural livelihoods (World Bank, 2023). Within this agricultural landscape, organic farming is gaining global recognition as a sustainable alternative to conventional agricultural practices (FiBL & IFOAM, 2024). Organic farming, which emphasizes the use of natural inputs and ecological processes, offers multiple benefits, including improved soil fertility, environmental conservation, and the production of chemical-free crops (FAO, 2019). Despite its advantages, the adoption and promotion of organic farming practices remain limited in many developing regions, including Yobe, Bauchi, and Gombe States, Nigeria (Adekola & Adekola, 2021).

Understanding farmers' awareness of organically farmed crops' nutritional and economic benefits is crucial to fostering sustainable agricultural development and improving rural livelihoods (FAO, 2011).Yobe, Bauchi, and Gombe States are located in the northeastern region of Nigeria and are characterized by a predominantly agrarian population, where farming is a major source of income and food supply (National Bureau of Statistics, 2024).The states' climatic conditions, marked by arid and semi-arid zones, present challenges for conventional farming systems, making sustainable agricultural practices like organic farming increasingly important (Adebayo *et al*., 2023).

Organically farmed crops are known to have superior nutritional value due to the absence of synthetic fertilizers and pesticides, which helps preserve essential vitamins, minerals, and antioxidants (Baranski *et al*., 2014). Additionally, organic farming has the potential to offer economic benefits, such as premium market prices, reduced input costs, and improved access to specialized markets for organic produce (Pimentel *et al.*, 2005).

However, the extent to which farmers in Yobe, Bauchi, and Gombe States are aware of these benefits remains unclear. This knowledge gap necessitates an empirical investigation to assess their levels of awareness and to identify the factors that influence their adoption of organic crop farming practices.

Awareness is a critical factor in shaping the adoption of agricultural innovations (Rogers, 2003). Farmers who are well-informed about the benefits of organic farming are more likely to adopt such practices, enhancing their productivity and household income while contributing to environmental sustainability (Sani & Zubairu, 2021). An assessment of farmers' awareness of the nutritional and economic benefits of organically farmed crops will provide valuable insights for policymakers, agricultural extension workers, and development organizations. These insights can guide the design of

targeted awareness campaigns and training programs aimed at promoting organic farming practices and improving agricultural sustainability in the study areas.

This study aims to evaluate the level of awareness among farmers in the study areas regarding the nutritional, economic, and environmental benefits of organically farmed crops. Specifically, it seeks to identify the sources of information available to farmers, examine their perceptions and attitudes toward organic farming, and analyze the socio-economic factors influencing their awareness. Similarly, it will also evaluate the adoption level among farmers who are aware of this farming system. The findings from this research will contribute to policy formulation and the development of intervention strategies that encourage the adoption of organic farming practices. Ultimately, promoting organic agriculture can enhance food security, improve public health, and support the economic well-being of rural communities in Yobe, Bauchi, and Gombe States.

LITERATURE REVIEW

Organic farming is a production system that relies on ecological processes, biodiversity, and natural cycles adapted to local conditions rather than the use of synthetic inputs such as chemical fertilizers and pesticides (IFOAM, 2022). It emphasizes sustainability, soil health, and environmental protection while producing crops and livestock through natural means. According to the Food and Agriculture Organization (FAO, 2020), organic farming has grown steadily worldwide due to increasing consumer demand for healthier food and environmentally friendly practices.

In developing countries like Nigeria, organic farming offers a promising solution to food insecurity, environmental degradation, and declining soil fertility. It provides a sustainable alternative to conventional farming by promoting the use of organic inputs, crop rotation, composting, and biological pest control (Emefiena & Olufemi, 2021). However, the adoption of organic farming practices in Nigeria remains low.

Research indicates that organically farmed crops contain higher levels of essential nutrients compared to conventionally grown crops. According to a meta-analysis by Barański *et al*. (2014), organic crops generally have higher concentrations of antioxidants, vitamins, and certain minerals due to the absence of synthetic pesticides and fertilizers. Furthermore, organically grown produce tends to have lower levels of pesticide residues and heavy metals, improving food safety and reducing health risks (Dangour *et al*., 2017).

In rural areas where malnutrition is a persistent challenge, the promotion of organically farmed crops could enhance dietary diversity and improve public health outcomes. Studies in similar agro-ecological zones of Nigeria indicate that smallholder farmers who adopt organic practices can improve the nutritional value of their produce, contributing to better household food security (Aluko *et al*., 2019).

The economic benefits of organic farming are well-documented, particularly in the context of small-scale agriculture. Organically farmed crops often fetch premium prices in domestic and international markets due to increased consumer demand for chemical-free products (Adebayo

& Yusuf, 2020). Organic farming can also reduce production costs by eliminating the need for expensive synthetic inputs and relying on locally available organic materials.

A study by Nwachukwu *et al*. (2022) in northern Nigeria found that farmers who adopted organic practices reported higher profit margins, improved soil fertility, and increased long-term productivity. Additionally, organic farming opens up opportunities for farmers to access specialized markets and participate in organic certification schemes, further enhancing their economic well-being (IFOAM, 2021).

Organic farming is recognized as a sustainable agricultural system that promotes environmental conservation through the use of natural processes and inputs. It relies on ecological principles such as crop rotation, composting, biological pest control, and the avoidance of synthetic chemicals (IFOAM, 2022). As concerns about environmental degradation and climate change grow, organic farming is increasingly viewed as a viable solution to mitigate the environmental impacts of conventional agriculture (Reganold & Wachter, 2016). This literature review examines the environmental benefits of organic farming, focusing on its effects on soil health, biodiversity, water quality, climate change mitigation, and overall ecosystem sustainability.

One of the most significant environmental benefits of organic farming is its positive impact on soil health. Organic farming practices, such as composting, crop rotation, and the use of organic manure, enhance soil structure and fertility (Lori *et al*., 2017). Research shows that organic farms typically have higher levels of organic matter, which improves soil aeration, water retention, and nutrient cycling (Gattinger *et al*., 2012).

A meta-analysis conducted by Rahmann *et al*. (2021) found that organic farming increases soil organic carbon by 20% compared to conventional farming. This is critical in combating soil degradation, which is a major challenge in arid and semi-arid regions like Yobe State. Additionally, organic practices reduce soil erosion by promoting ground cover and minimizing soil disturbance through reduced tillage (Cooper *et al*., 2016).

Organic farming fosters biodiversity both above and below the soil surface. By avoiding synthetic pesticides and herbicides, organic systems support a wide range of plant and animal species (Bengtsson *et al*., 2005). Studies indicate that organic farms host 30% more species of flora and fauna than conventional farms (Tuck *et al*., 2014).

According to Hole *et al*. (2005), organic fields contain more pollinators, such as bees and butterflies, which play a vital role in crop production and maintaining ecological balance. Furthermore, organic practices encourage the preservation of native plant species and promote habitat conservation through intercropping and the maintenance of buffer zones. This is particularly important in regions where agricultural expansion threatens natural ecosystems.

Organic farming contributes to improved water quality by reducing the use of synthetic fertilizers and pesticides, which are major sources of water pollution. Conventional farming practices often lead to nitrate leaching and pesticide runoff, contaminating groundwater and surface water systems (van de Perre *et al*., 2010).

A study by Hansen *et al*. (2022) found that organic farms have 50% lower nitrate leaching rates than conventional farms, reducing the risk of water contamination. Furthermore, the use of organic mulch and cover crops enhances water retention and reduces runoff, preserving water resources in drought-prone areas l ike Yobe State (Kremen *et al*., 2012).

Organic farming plays a significant role in mitigating climate change by reducing greenhouse gas (GHG) emissions and enhancing carbon sequestration. Organic systems typically rely on biological nitrogen fixation rather than synthetic fertilizers, which are a major source of nitrous oxide (N_2O) emissions—a potent greenhouse gas (Scialabba & Müller-Lindenlauf, 2010).

Research by Gattinger *et al*. (2012) indicates that organic farms sequester more carbon in the soil due to practices like crop diversification, cover cropping, and reduced tillage. Furthermore, organic farms emit lower levels of carbon dioxide (CO_2) and methane (CH_4) compared to conventional farms (Mäder *et al*., 2015). This is particularly relevant for climate-sensitive regions where sustainable land management is essential for long-term agricultural productivity.

Organic farming minimizes chemical pollution by eliminating synthetic pesticides, herbicides, and fertilizers. These chemicals are known to harm non-target organisms, disrupt ecosystems, and accumulate in food chains (Geiger *et al*., 2010). By adopting natural pest control methods such as biological predators and botanical extracts, organic systems reduce environmental contamination and promote ecological balance (Pimentel *et al*., 2005).

Organic farming supports a variety of ecosystem services, including pollination, pest regulation, and soil fertility. By maintaining diverse crop landscapes and natural habitats, organic farms provide essential ecological functions that benefit both agricultural productivity and biodiversity (Kremen & Miles, 2012).

Several empirical studies highlight the importance of assessing farmers' awareness. For instance, Ajayi *et al*. (2018) found that awareness programs led by extension agents significantly increased organic farming adoption in southwestern Nigeria. Similarly, according to Ogunniyi *et al*. (2020), farmers with access to media and extension services were more likely to adopt organic practices in northern Nigeria. In a more recent, Yahaya *et al*. (2023) concluded that addressing socio-economic constraints and improving access to organic inputs are critical for promoting organic agriculture in the northeastern region.

Awareness is a critical determinant of the adoption of agricultural innovations. Several studies suggest that factors such as education, access to extension services, and media exposure play vital roles in shaping farmers' knowledge of organic farming (Ajayi *et al*., 2018). According to Rogers' Diffusion of Innovation Theory (2003), the spread of new agricultural practices depends on effective communication channels and the perceived benefits of the innovation.

In some of the northern states of Nigeria, limited extension services and poor access to information may hinder farmers' awareness of organic farming practices. Empirical research in Nigeria reveals that farmers with higher levels of education and frequent interaction with extension agents are more likely to be aware of and adopt organic farming (Ogunniyi *et al*., 2020).

This study will bridge these gaps by providing empirical data on farmers' awareness, identifying key socio-economic factors, and offering policy recommendations to enhance the adoption of organic farming in the study area.

METHODOLOGY

Study Area and Design

The survey research was conducted in Yobe, Bauchi and Gombe states of Northeastern Nigeria. The states share common boundaries, and climatic conditions, although some variations due to topography and vegetation exist. A cross-sectional survey design was used to both numerical and categorical data.

Sampling Procedure

This survey was conducted across three Northeastern Nigerian states: Yobe, Bauchi, and Gombe. These states, while sharing a common geography and climate, were chosen to account for minor variations in topography and vegetation. A **cross-sectional survey design** to gather both quantitative (numerical) and qualitative (categorical) data was employed.

Sampling Methodology

A **multi-stage sampling procedure** was implemented to select a representative sample of respondents. From each of the three states, three LGAs (one urban and two rural) were randomly selected. Within these LGAs, a specific number of enumeration areas (EAs)—four in each urban LGA and three in each rural LGA were selected.

- Total LGAs per state: 3.
- Total EAs per state: 10 (4 urban + 6 rural).
- Respondents per EA: 50.
- Total respondents per state: 500 (10 x 50).
- Sample size: 1,500 (500 x 3)

Data Collection and Analysis

The data were collected using a **structured questionnaire** and analyzed using **descriptive statistics** with SPSS software, version 27.

RESULTS

Demographic Characteristics of Respondents

Age

The results for demographic characteristics of respondents in Bauchi State revealed that 61% of respondents were between 41-60 years (Fig. 1). However, those between that age range in Gombe and Yobe states we 53 and 59% (fig. 2 and 3) respectively.

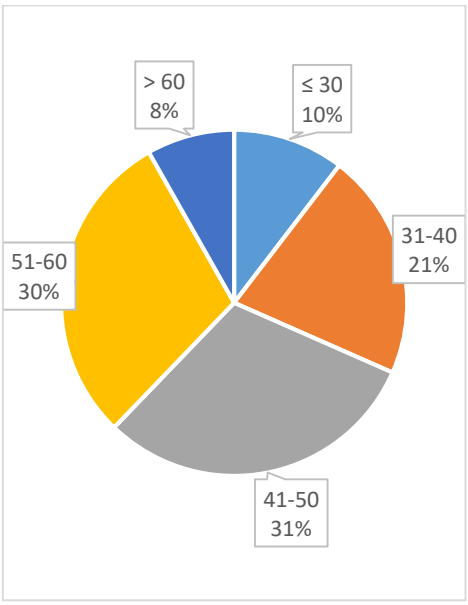

Fig. 1: Age of Respondents: Bauchi State

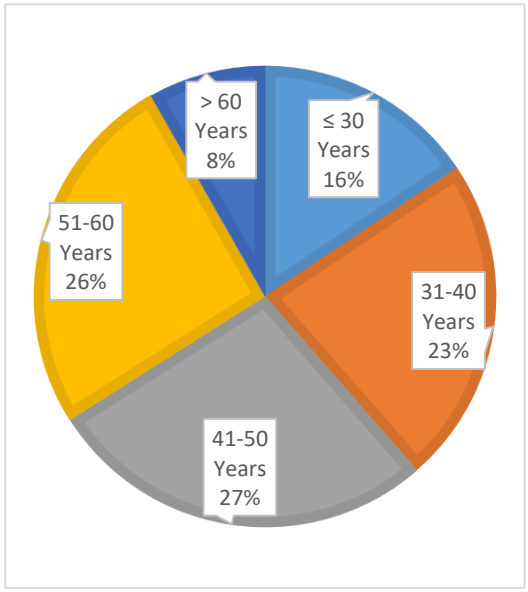

Fig. 2: Age of Respondents: Gombe State

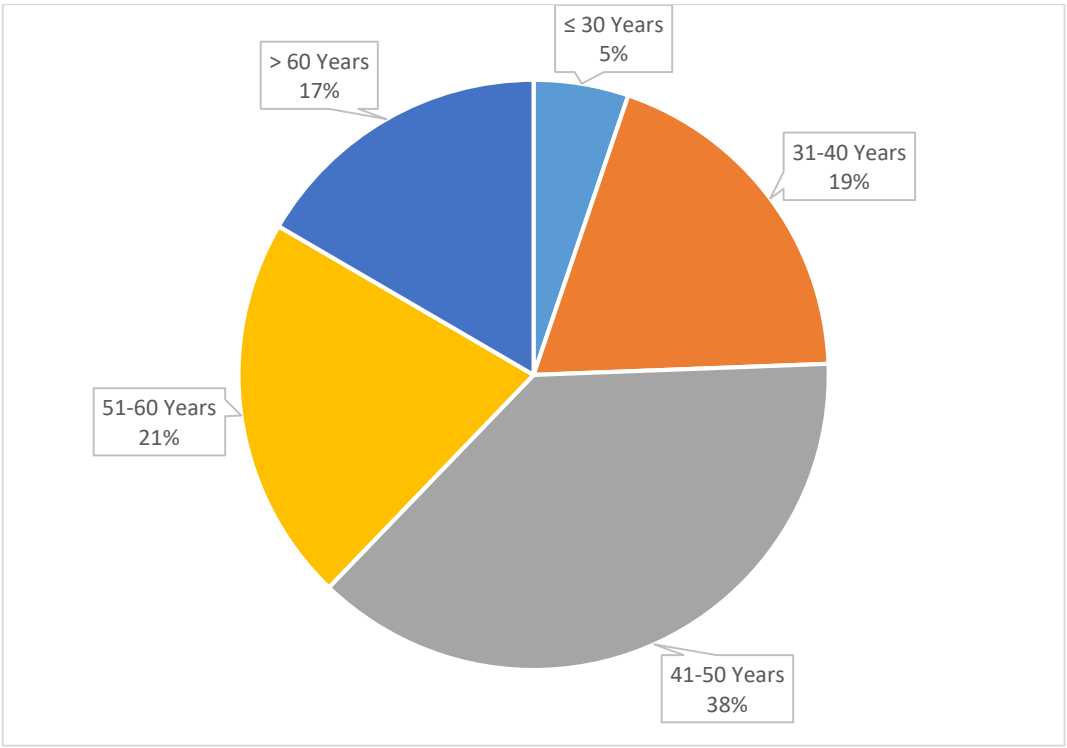

Fig. 3: Age of Respondents: Yobe State

Gender Distribution

Gender analysis of the respondents showed that Gombe state had 90% males (fig. 4), while the states of Bauchi and Yobe had respective percentages of 87 and 75 males (figs. 5 and 6).

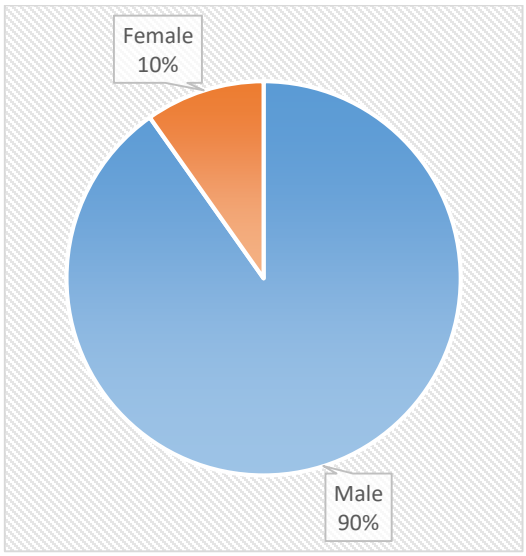

Fig. 4: Gender of Respondents: Gombe State

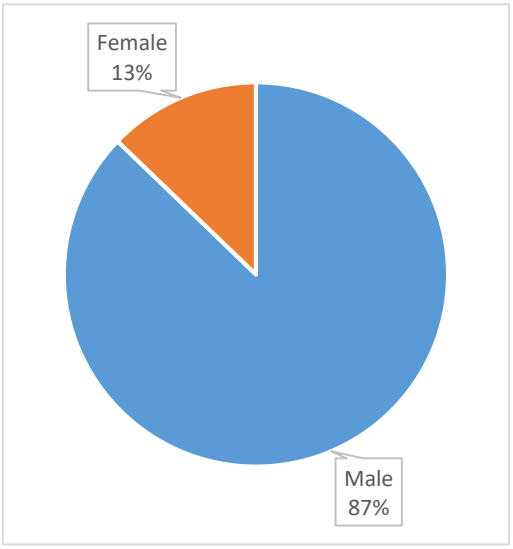

Fig. 5: Gender of Respondents: Bauchi State

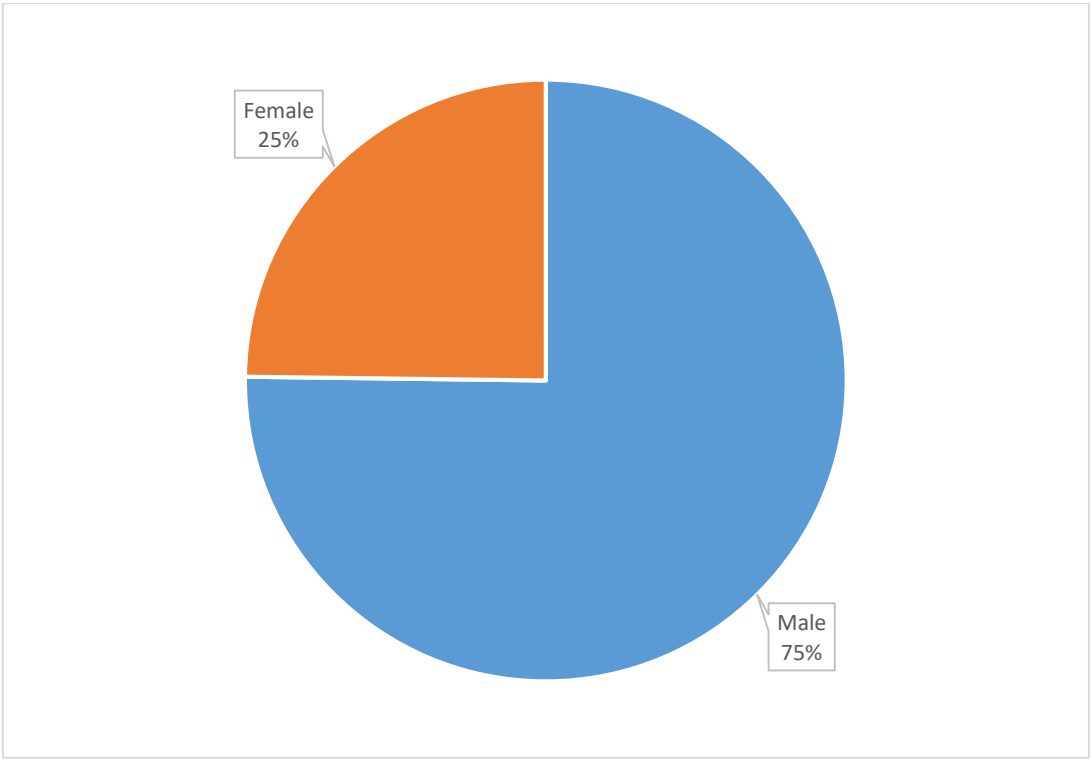

Fig. 6: Gender of Respondents: Yobe State

Educational Level

Majority (34%) of the respondents in Yobe state had informal education (fig. 7), compared to 41% in Gombe state (fig. 8) and Bauchi state where most (35.2%) of the respondents had primary education (fig. 9).

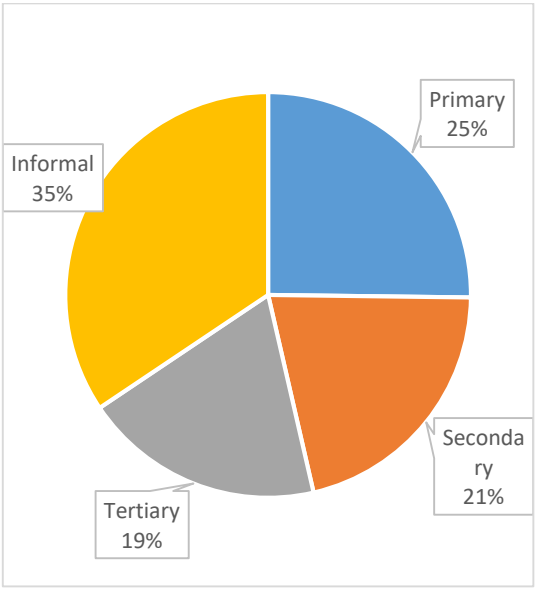

Fig. 7: Educational Level: Yobe State

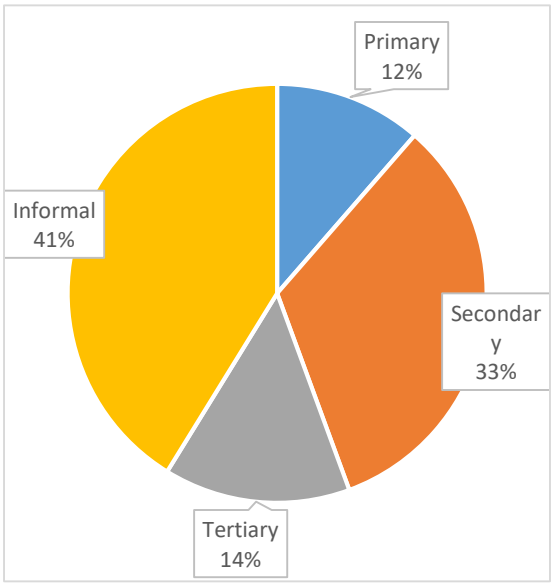

Fig. 8: Educational Level: Gombe State

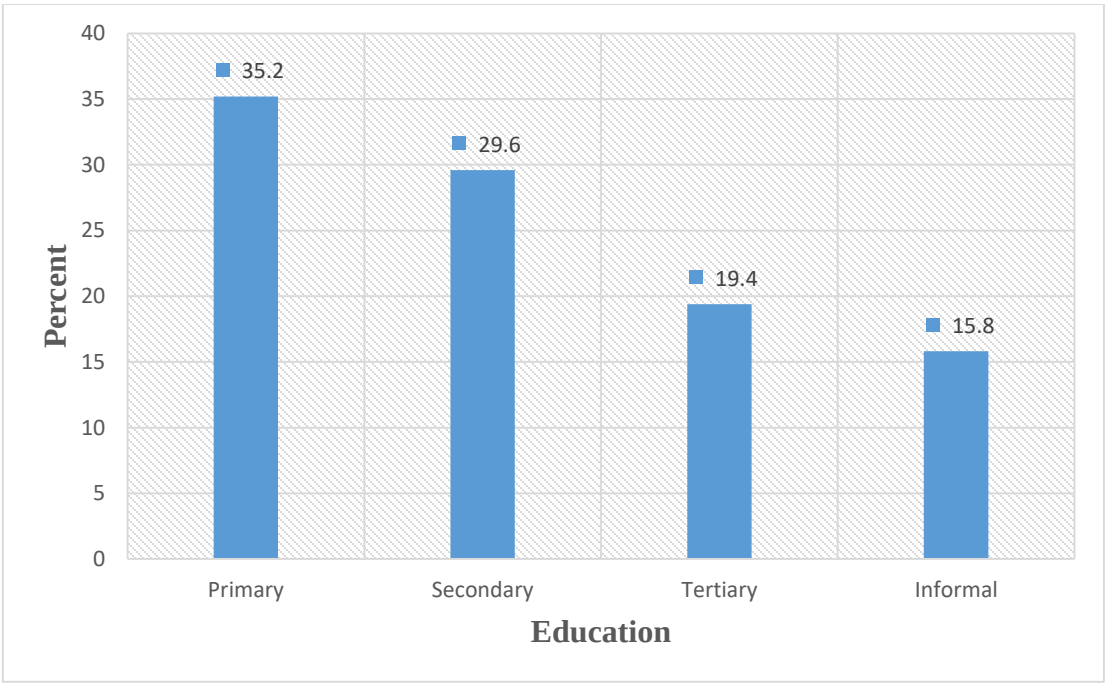

Fig. 9: Educational Level: Bauchi State

Marital Status

In Gombe state, most (87%) of the respondents are married (fig. 10), this is closely followed by Bauchi state (83.6%) (fig. 11) and lastly Yobe state with 55% (fig. 12).

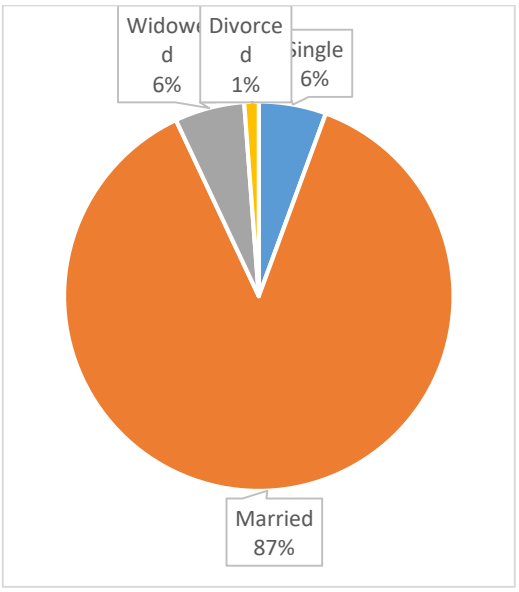

Fig. 10: Marital Status: Gombe state

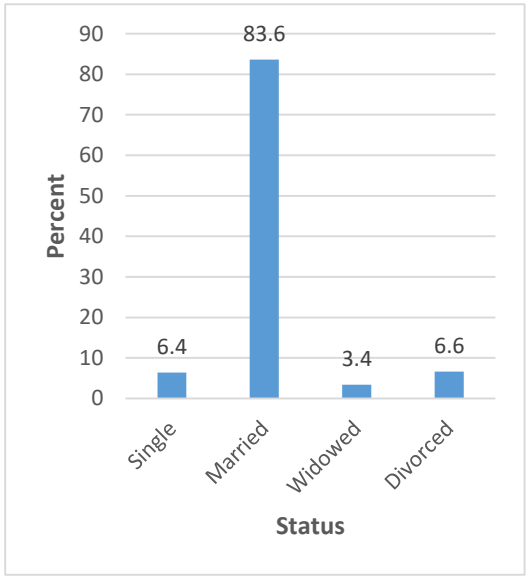

Fig. 11: Marital Status: Bauchi State

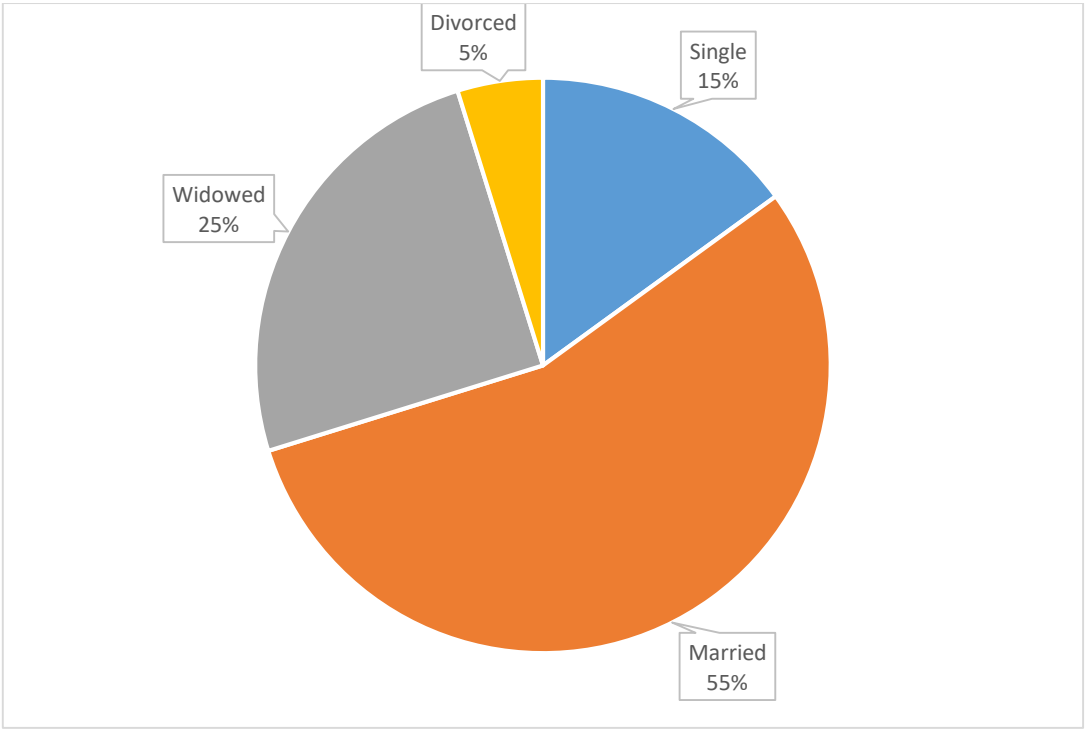

Fig. 12: Marital Status: Yobe State

Household Size

Majority of respondents across the three states had a family size of between 5 and 15 members. Bauchi had a higher percentage of 63 (fig. 13), followed by Gombe, 55% (fig. 14) and Yobe 53% (fig. 15).

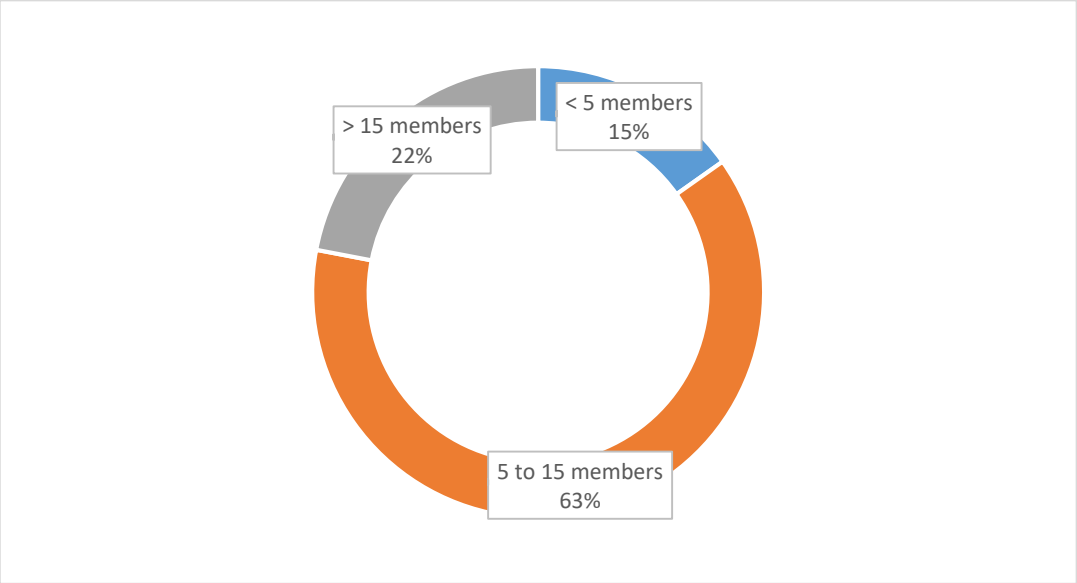

Fig. 13: Household Size: Bauchi State

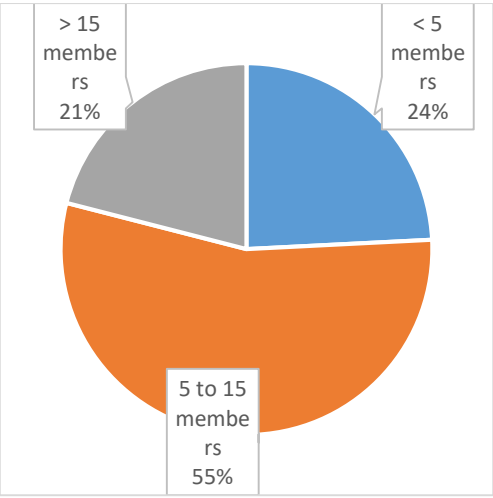

Fig. 14; Household Size: Gombe state

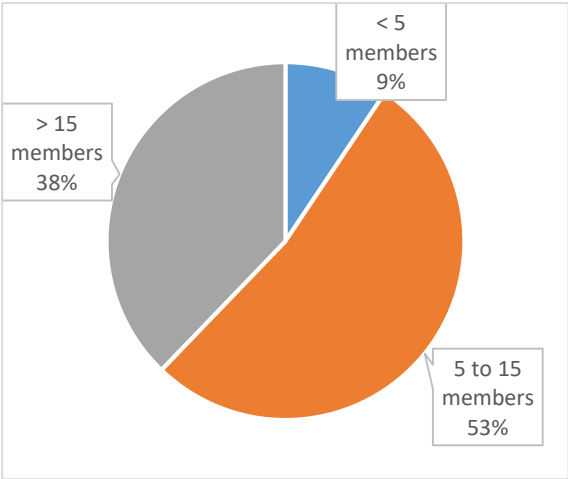

Fig. 15; Household Size: Yobe state

Economic Characteristics of Respondents

Farming Experience

Majority of the respondents in Yobe (47.8%) and Bauchi (45.2%) states (Tables 3 and 2) had a farming experience of over 15% years, unlike in Gombe state where majority of respondents had only 5 – 15 years of experience (Table 2).

Major Crops Cultivated

In Gombe state (Table 2), the major crop cultivated by respondents was maize (34.6%). Yobe (30.4%) and Bauchi (28.2%) states had sorghum and millet respectively (Tables 3 and 1) as the most cultivated crops.

Awareness of Organic Farming

Most of the respondents across the three states are slightly aware about organic farming; Bauchi 81.2%, Gombe 63.4% and Yobe 54.8% (Tables 1-3)

Awareness of the Nutritional Benefits of Organically Farmed Crops

Across the three states, majority (51.8 – 71.6%) of respondents disclosed that they are not aware of the nutritional benefits of organically farmed crops (Tables 1-3).

Awareness of the Economic Benefits of Organic farming

Similarly, most of the respondents; Bauchi 94.6%, Gombe 90.4% and Yobe 71% are not aware of the economic benefits of organic farming (Tables 1-3).

Awareness of the Environmental Benefits of Organic farming

Environmental benefit of organic farming is also another aspect that majority of respondents in the study area are not aware of; Bauchi 86.6%, Gombe 78.6%, and Yobe State 65.6% (Tables 1-3).

Awareness of the Benefits of Organic Farming to the Soil

Conversely, the respondents, most of them are aware of the positive impact of organic farming on farm soil. In Bauchi state, awareness level was 68.2%, Gombe state 63%, and Yobe state53% (Tables 1-3).

Practices of Organic Farming

On the various forms of organic farming, the one that most respondents across all states practiced was intercropping. In Bauchi state, 47.2% practice intercropping, 28.6% use organic fertilizer while 17.2% revealed that they practice crop rotation. The data for Gombe state showed that 45.2% were into intercropping, 25.2% crop rotation, and 21.2% use organic fertilizer. In Yobe state, however, the percentage of respondents that indicated the practice intercropping was lower (39.2%) than in the other two states. Green manuring as a practice in organic farming is low (0.4-1.8%) across the three states (Tables 1-3).

Table 1: Economic Profile of Respondents: Bauchi state

S/N	Variable	Frequency	Percent
1	**Farming Experience (Years)**		
	< 5	134	12.2
	5 to 15	287	42.6
	> 15	299	45.2
2	**Major Crops Cultivated**		
	Maize	89	17.8
	Sorghum	137	27.4

	Millet	141	28.2
	Rice	76	15.2
	Cowpea	21	4.2
	Groundnut	36	7.2
3	**Awareness of Organic Farming**		
	Not Aware	52	10.4
	Slightly Aware	406	81.2
	Fully Aware	42	8.4
4	**Awareness of the Nutritional Benefits of Organically Produced Crops**		
	Aware	241	48.2
	Not Aware	259	51.8
5	**Awareness of the Economic Benefits of Organically Produced Crops**		
	Aware	27	5.4
	Not Aware	473	94.6
6	**Awareness of the Environmental Benefits of Organically Produced Crops**		
	Aware	67	13.4
	Not Aware	433	86.6
7	**Awareness of the benefits of Organic Farming to the Soil**		
	Aware	341	68.2
	Not Aware	159	31.8
8	**Practices of Organic farming**		
	Composting	15	3
	Crop rotation	86	17.2
	Use of Organic Fertilizer	143	28.6
	Reduced Tillage	11	2.2
	Green Manuring	9	1.8
	Intercropping	236	47.2

Source: Field Survey, 2025

Table 2: Economic Profile of Respondents: Gombe State

S/N	Variable	Frequency	Percent
1	**Farming Experience (Years)**		
	< 5	37	7.4
	5 to 15	318	63.6
	> 15	145	29
2	**Major Crops Cultivated**		
	Maize	173	34.6
	Sorghum	82	16.4
	Millet	133	26.6

S/N	Variable	Frequency	Percent
	Rice	48	9.6
	Cowpea	53	10.6
	Groundnut	11	2.2
3	**Awareness of Organic Farming**		
	Not Aware	78	15.6
	Slightly Aware	317	63.4
	Fully Aware	105	21
4	**Awareness of the Nutritional Benefits of Organically Produced Crops**		
	Aware	196	39.2
	Not Aware	304	60.8
5	**Awareness of the Economic Benefits of Organically Produced Crops**		
	Aware	48	9.6
	Not Aware	452	90.4
6	**Awareness of the Environmental Benefits of Organically Produced Crops**		
	Aware	107	21.4
	Not Aware	393	78.6
7	**Awareness of the benefits of Organic Farming to the Soil**		
	Aware	315	63
	Not Aware	185	37
8	**Practices of Organic farming**		
	Composting	28	5.6
	Crop rotation	126	25.2
	Use of Organic Fertilizer	106	21.2
	Reduced Tillage	10	2
	Green Manuring	4	0.8
	Intercropping	226	45.2

Source: Field Survey, 2025

Table 3: Economic Profile of Respondents: Yobe State

S/N	Variable	Frequency	Percent
1	**Farming Experience (Years)**		
	< 5 Years	74	14.8
	5 to 15 Years	187	37.4
	> 15 Years	239	47.8
2	**Major Crops Cultivated**		
	Maize	101	20.2

S/N	Variable	Frequency	Percent
	Sorghum	152	30.4
	Millet	119	23.8
	Rice	26	5.2
	Cowpea	48	9.6
	Groundnut	54	10.8
3	**Awareness of Organic Farming**		
	Not Aware	84	16.8
	Slightly Aware	274	54.8
	Fully Aware	142	28.4
4	**Awareness of the Nutritional Benefits of Organically Produced Crops**		
	Aware	142	28.4
	Not Aware	358	71.6
5	**Awareness of the Economic Benefits of Organically Produced Crops**		
	Aware	145	29
	Not Aware	355	71
6	**Awareness of the Environmental Benefits of Organically Produced Crops**		
	Aware	172	34.4
	Not Aware	328	65.6
7	**Awareness of the benefits of Organic Farming to the Soil**		
	Aware	265	53
	Not Aware	235	47
8	**Practices of Organic farming**		
	Composting	12	2.4
	Crop rotation	174	34.8
	Use of Organic Fertilizer	100	20
	Reduced Tillage	16	3.2
	Green Manuring	2	0.4
	Intercropping	196	39.2

Source: Field Survey, 2025

DISCUSSION

The results on the age of respondents revealed that majority of farmers in the study area are between 41 and 60 years old. A consistent finding in agricultural studies in Nigeria is the advanced age of the farming population, as noted by Mijinyawa *et al*. (2020). This demographic trend has significant implications for agricultural productivity and food security. An additional report from BusinessDay Nigeria (2019) cites the average age of a Nigerian farmer as 60, describing it as a setback for food security. The results also show a low level of youth engagement in farming despite high rates of unemployment. This is in line with the findings of the International Fund for Agricultural Development (IFAD) (2017).

Similarly, the findings of the present study revealed a poor participation of females in farming activities across all states in the study area. According to the Food and Agriculture Organization (FAO) (2018), only 4-8% of women in the North-East and North-West of Nigeria own land compared to 50% of men. The report further highlighted that this lack of ownership prevents women from making independent farming decisions or using the land as collateral for agricultural loans. Rahman (2008) asserted that this is a widespread issue across the region, where cultural and religious norms often dictate that men, as the heads of households, make key farming decisions.

The study also revealed that the major crops produced by farmers in the study area are cereals. This confirms an earlier report that Northern Nigeria is the heartland of cereal production in the country, as stated by Ajeigbe *et al*. (2018).

Most farmers in the study area indicated that they are slightly aware of organic farming. This confirms an earlier report by Mbah *et al*. (2020) that many farmers are aware of specific organic practices, such as using animal manure and crop rotation; however, their knowledge of a holistic, integrated organic system is often limited. In addition, a more recent study, Wasil *et al*. (2022) reported that while farmers are highly aware of practices like crop rotation and mulching, their awareness of more complex techniques, like formulated organic pesticides and kitchen waste composting, was low. This suggests a knowledge gap that needs to be addressed through targeted education and extension services

CONCLUSION

The survey concluded that an average of 63% farmers in Bauchi, Gombe, and Yobe states are aware of basic organic practices like organic fertilizer use, intercropping, and crop rotation. Conversely, their understanding of advanced techniques, such as composting, reduced tillage, and green manuring is minimal. Furthermore, farmers demonstrate an extremely low awareness of the key nutritional, economic, and environmental benefits of organic crop farming.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are crucial to enhance the awareness and adoption of organic farming practices among farmers in Bauchi, Gombe, and Yobe states:

1. Strengthen Agricultural Extension Services: The government, through its agricultural development programs, should revitalize and expand the reach of agricultural extension services. Extension officers should be trained to educate farmers on the full spectrum of organic farming practices.
2. Develop Targeted Training Programs: There is a need for well-structured training programs and workshops tailored to the local context. These programs should not only focus on the "how-to" of advanced organic farming techniques but also emphasize the "why"—explicitly highlighting the nutritional, economic, and environmental benefits.

3. Promote Awareness through Diverse Channels: Information dissemination should not be limited to formal extension agents. Community radio stations, local language publications, and peer-to-peer farmer networks should be leveraged to disseminate information about the benefits and practices of organic farming.
4. Establish Support Systems for Organic Farmers: To encourage a full transition to organic farming, it is essential to create a supportive institutional environment. This includes establishing easily accessible information centers, providing access to organic inputs (e.g., compostable materials, organic seed banks), and facilitating connections between organic farmers and potential markets.

NEED FOR FURTHER RESEARCH

The findings of this study provide a foundational understanding of the state of organic farming awareness in Northeastern Nigeria but also highlight several areas that require further investigation. Therefore, the following are recommended for future research:

3 Investigate the Barriers to Adoption: While this study identified a low level of awareness, it did not delve deeply into the specific reasons for the minimal adoption of advanced organic techniques. Future research should use a mixed-methods approach (quantitative and qualitative) to explore the socio-cultural, economic, and institutional barriers that prevent farmers from adopting these practices, even when they are aware of them.

4 Conduct a Comparative Study on Economic Viability: There is a need for a comparative analysis of the economic returns of organic versus conventional farming in the study area. This research should assess factors such as yield, cost of inputs, labor requirements, and market prices to provide farmers with a clear understanding of the long-term economic benefits of transitioning to organic agriculture.

5 Assess the Impact of Targeted Training Interventions: A longitudinal study could be conducted to evaluate the effectiveness of a pilot training program on advanced organic farming techniques. This research would track changes in farmers' knowledge, attitudes, and actual adoption of practices over time, providing valuable data to inform future extension and policy initiatives.

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