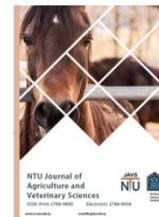




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Perceived benefits, knowledge, and attitudes of smallholder farmers towards nutrition-sensitive agriculture in Ilorin East Local Government Area, Kwara State, Nigeria

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ABSTRACT

Nutrition-sensitive agriculture focuses on the cultivation, processing, and consumption of a variety of nutrient-rich foods to promote nutritional diversity. This study assessed the benefits, knowledge, and attitudes of smallholder farmers towards nutrition-sensitive agriculture in Ilorin East LGA of Kwara State, Nigeria. The findings revealed that the majority (91%) of the farmers were aware that milk is important for the development and strength of our bones. The nutrition-sensitive advisory services are essential for farmers (mean=4.57) was the highest-ranked attitudinal statement. The enhancement of household food security (mean=2.77) was the highest-ranked benefit of nutrition-sensitive agricultural practice. The study thus recommended that extension service providers should create more awareness on the importance of nutrition-sensitive agricultural practices



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Introduction

Nutrition-sensitive agriculture (NSA) has emerged as a strategy that integrates agricultural interventions with nutrition results, aiming to ensure that agricultural practices directly contribute to improving dietary diversity, food quality, and overall nutritional security [13]. The goal of nutrition-sensitive agriculture is to use agricultural practices as a way of improving nutrition. It places a strong emphasis on procedures to raise the nutritional value of foods, such as livestock integration, crop diversity, and biofortification. NSA unites nutrition goals, encouraging the production and consumption of nutrient-rich crops, fruits, and vegetables, in divergence from traditional agricultural methods that place a higher precedence on output and financial returns [7]. This approach agrees with international campaigns that support a multifaceted method to addressing malnutrition, such as the United Nations Decade of Action on Nutrition (2016–2025) and the Sustainable Development Goals (SDG 2: Zero Hunger).

NSA encourages the cultivation of nutrient-rich crops, small-scale livestock production, and homestead gardening, which enhances food and nutrition security [12]. NSA focuses on agricultural practices that enhance the nutritional consequences, particularly for the susceptible groups like women and children. The crucial methods of nutrition-sensitive agriculture include the diversification of cultivated crops, crop rotation, integrated farming systems, climate-smart practices, post-harvest loss food reduction, small-scale aquaculture, and livestock integration [6; 14]. Understanding the nutritional value of numerous food items, the importance of balanced diets, and the impact of agriculture on improving nutrition are all examples of knowledge. Research has indicated that farmers in low- and middle-income nations have major obstacles in implementing NSA practices due to a lack of awareness and expertise [8]. However, poor and developing countries like Nigeria can address food shortages and nutritional insecurity through the adoption of nutrition-sensitive agricultural practices. According to the FAO [5], based on data collected between March and May 2025, approximately 24.9 million people across Nigeria are facing high levels of acute food insecurity. The introduction and acceptance of NSA practices would help to reduce the severe and alarming rates of food and nutritional insecurity in the country. In Nigeria, a lack of specialized nutrition education programs, low literacy rates among rural farmers, and insufficient agricultural extension services frequently impede the spread of information about NSA. Farmers'

capacity to make educated decisions is hampered by their frequent ignorance of the connection between their farming methods and the nutritional results of their households and communities.

To promote dietary diversity and enhance general health outcomes of farmers and rural people, nutrition-sensitive agriculture is important as it places a strong emphasis on the cultivation, processing, and consumption of a variety of nutrient-rich foods. This research would help in future government policy formulations and the decision-making process on nutrition-sensitive agriculture.

The extent to which rural farmers are equipped with the information, awareness, and practical expertise required for NSA is not known. These established the gaps this study sought to fill. Therefore, there is a need to assess the benefits, knowledge and attitudes of smallholder farmers towards nutrition-sensitive agriculture in Ilorin East LGA of Kwara State, Nigeria.

The specific Objectives were to:

1. Examine the farmers' knowledge of nutrition-sensitive foods in the study area,
2. Examine the attitude of farmers regarding nutrition-sensitive agricultural practices in the study area,
3. Determine the perceived benefits of nutrition-sensitive agricultural practices in the study area.
4. Identify the challenges of practicing nutrition-sensitive agricultural practices in the study area.

Theoretical Perspective

Health Belief Model (HBM)

The Health Belief Model (HBM) was developed in the 1950s and refined over time to predict health-related behaviors. It advocates that individuals' engagement in health-promoting behaviors is determined by their perceptions of susceptibility to a condition, its severity, the benefits of action, and barriers to taking that action [6]. Cues to action and self-efficacy were later added to the model. In the context of Nutritional Sensitive Agricultural Practices, the Health Belief Model provides an understanding of how farmers perceive vulnerability to malnutrition, and their belief in the efficacy of agricultural nutrition interventions can influence their willingness to adopt nutrition-enhancing practices.

HBM provides a framework for designing interventions that promote Nutritional Sensitive Agricultural Practices. By addressing each construct, programs can be tailored to overcome specific challenges and increase adoption. An intervention might include:

- Raising awareness (Susceptibility & Severity): Using storytelling or dramatic

presentations to highlight the consequences of malnutrition.

- Highlighting benefits: Clearly communicating the health and economic advantages of adopting a diversified diet.
- Reducing barriers: Providing financial assistance for seeds, offering training, and creating community support groups.
- Triggering action (Cues to Action): Using community leaders, agricultural extension agents, and local media to send encouraging messages.
- Building confidence (Self-efficacy): Offering practical demonstrations and ongoing support to ensure farmers feel capable of succeeding.

Materials and Methods

This research was carried out in Ilorin East LGA of Kwara State, Nigeria. Kwara state is situated between Latitudes 8.57111 and Longitudes 4.72833. Oke-oyi is the Headquarter of the local government area. The area of Ilorin East LGA is 486 KM² and a population of 204, 310 people at the 2006 census [9]. A 2-stage sampling technique was used for the study. The 1st stage involved a random sampling of 6 rural communities in the local Government area. The six randomly selected communities were Oke-oyi, Oke-ose, Baadi, Apado, Magaji-Are and Iponrin. The second stage involved a random selection of 50% of the farmers from the selected communities (Oke-oyi = 31, Oke-ose = 15, Baadi=10, Apado=17, Magaji-Are=16 and Iponrin=11. The total number of respondents for the study was 100 smallholder farmers. The Knowledge level of nutrition-sensitive agriculture was measured with a 2-point scale of Yes (2) and No (1).

The attitudes of farmers towards nutrition-sensitive agriculture were measured with a 5 point- Likert typed scale of Strongly Agree (5), Agree (4), Neutral (3), Strongly Disagree (2), and Disagree (1). The perceived benefits of nutrition-sensitive agricultural practices were measured on a 3 point -Likert typed scale of Highly Beneficial (3), Beneficial (2), and Not Beneficial (1). The challenges of practicing nutrition-sensitive agriculture were measured with a 4 point- Likert typed scale of Very Severe (4), Severe (3), Not Severe (2), and Not a Problem (1). The statistical tools used to analyse the data were frequency count, percentages, and mean.

Results and Discussion

Knowledge of Nutrition-Sensitive Foods

The findings presented in Table 1 revealed that the majority (91%) of the farmers were aware that milk is important for the development and strength of our bones. About 94% had knowledge that foods rich in Vitamin D reduce rickets in Children and about 90 % of the farmers were aware that tomatoes and

carrots are rich in calcium. This entails that the respondents had some knowledge of nutrition. This result aligns with [10], who stated that the provision of nutritional information to the rural farmers significantly improves their health-related practices. Additionally, only 43% knew fish as a source of Vitamin D, which may affect diet quality. These results reflect the findings of [1], who reported limited Nutrition-knowledge in specific micronutrient areas among smallholder farmers. Reassuringly, 89% of respondents recognized agriculture's direct link to household nutrition. This supports the assertion by [11] that nutrition-sensitive agriculture depends on farmers' awareness to promote food security and health.

Attitude of Farmers to Nutrition-Sensitive Agriculture

The findings in Table 2 showed that the attitudinal statement that nutrition-sensitive advisory services are essential for farmers (mean=4.57) was the highest-ranked attitudinal statement. Essential to improve the health of all members of farm families (mean=4.41) was the second-ranked attitudinal statement, and providing cheap household food for consumption (mean=4.01) was third ranked attitudinal statement. This finding infers that farmers have a positive attitude towards nutritionally sensitive agriculture. This result shows the need to integrate nutrition-sensitive agriculture into the agricultural extension services. This underscores the importance of integrating nutrition education into extension work, as noted by [2].

Benefits of Nutrition-Sensitive Agricultural Practices Being Implemented

The result in Table 3 revealed that enhancement of household food security (mean=2.77) was the highest-ranked benefit of nutrition-sensitive agricultural practice in the study area. Improved nutrition of household members (mean=2.63) was ranked second, and ensuring healthy living of household members (mean=2.41) was ranked third. This result reveals enhancement of household food security, improved nutrition of household members, and healthy living of household members were the main benefits of nutrition-sensitive agriculture. This aligns with the research of [11], who emphasized that nutrition-sensitive crop production enhances dietary variety and decreases malnourishment among rural families.

Challenges of Practicing Nutrition-Sensitive Agriculture

The findings in Table 4 revealed that the high cost of inputs (mean=3.64) was the most severe challenge of practicing nutrition-sensitive agriculture in the study area. Inadequate government support (mean=3.47) was ranked second, and lack of knowledge/training of nutrition-sensitive agriculture (mean=3.46) was ranked third. This finding entails that high cost of inputs, inadequate government

support, and lack of knowledge on nutrition-sensitive agriculture are the main challenges affecting nutrition-sensitive agriculture in the study area. This aligns with the results of [1; 3; 11], which revealed that the high cost of inputs and poor advisory services deter the adoption of nutritional innovations.

Conclusion

Based on the findings of this study, the study concluded that almost all the farmers were aware that milk is important for the development and strength of our bones and had knowledge that foods rich in Vitamin D reduce rickets in Children. The nutrition-sensitive advisory services are essential for farmers was the highest-ranked attitudinal statement. The enhancement of household food security was the highest-ranked benefit of nutrition-sensitive agricultural practice. The high cost of input, inadequate government support, and lack of knowledge on nutrition-sensitive agriculture are the main challenges affecting nutrition-sensitive agriculture.

Recommendations

In line with the findings of the study, the following recommendations were made:

1. Government should ensure that all the farmers involved in nutrition-sensitive agriculture receive necessary supports inform of supply of inputs, grants, loans, etc.
2. Extension service providers should create more awareness of the importance of nutrition-sensitive agricultural practices
3. There is a need for the provision of training on nutrition-sensitive agricultural practices to the farmers.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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Table 1. Distribution of Respondents on Knowledge of Nutrition-Sensitive Foods

NUTRITION KNOWLEDGE	Yes (%)	No (%)
Meat, fish, eggs, beans, and soybean value-added products are good protein sources	83 (83.0)	17 (17.0)
Starchy foods are the only sources of energy	11 (11.0)	88 (88.0)
Tomatoes and carrots are rich in Calcium	90 (90.0)	10 (10.0)
Oranges, melons, and pears taken together aid digestion	63 (63.0)	37 (37.0)
Fish is a source of Vitamin D	43 (43.0)	57 (57.0)
Foods rich in Vitamin D help reduce rickets in children	94 (94.0)	6 (6.0)
Milk is important for the development and strength of our bones	91 (91.0)	9 (9.0)
A poor diet can lead to terminal illness	90 (90.0)	10 (10.0)
Proper preservation is important to avoid food poisoning	91 (91.0)	9 (9.0)
Orange-fleshed potatoes are a cheap Vitamin A source	56 (56.0)	44 (44.0)
Consumption of a balanced diet is essential for the day-to-day farming activities of farmers	74 (74.0)	26 (26.0)
Agriculture has a direct link with household nutrition	89 (89.0)	11 (11.0)

Source: Field Survey, 2025.

Table 2. Distribution of Respondents on Attitude of Farmers towards Nutrition-Sensitive Agriculture

ATTITUDE	Mean	Standard dev.	Rank
Providing cheap household food for consumption	4.01**	0.98	3 rd
Conforms with our cultural norms and values	3.70**	1.09	5 th
Nutrition-sensitive advisory services are essential for farmers	4.57**	0.95	1 st
Farmers must grow and consume energy providing foods always	3.93**	0.87	4 th
Essential to improve the health of all members of farm families	4.41**	1.14	2 nd
NSA are for the elites in urban areas who grow crops, not for rural populace	3.13**	1.28	7 th
NSA is not necessary for healthy living in the rural areas	2.65*	1.14	9 th
Extension workers are only meant to provide technical advice	2.97*	1.18	8 th
Diseases are from God, what we eat cannot cause diseases	2.28*	1.09	10 th
What I produce on the farm should mostly be for sales and not consumption.	3.19**	1.26	6 th

Source: Field Survey, 2025, Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D) Strongly Disagree (SD), Note: (1+2+3+4+5=15/5=3), hence Positive Attitude =3, Negative Attitude =2.99

Table 3. Distribution of Respondents on Benefit of Nutrition-Sensitive Agricultural Practices

BENEFITS	HB (%)	B (%)	NB (%)	Mean	Standard dev.	Rank
Improved nutrition of household members	70 (70.0)	23 (23.0)	7 (7.0)	2.63	0.61	2 nd
Ensures healthy living of household members	46 (46.0)	49 (49.0)	5 (5.0)	2.41	0.59	3 rd
Enhance household food security	81 (81.0)	15 (15.0)	4 (4.0)	2.77	0.51	1 st
Sales of produce increase income	23 (23.0)	62 (62.0)	15 (15.0)	2.08	0.61	4 th

Source: Field Survey, 2025. Highly Beneficial (HB), Beneficial (B), Not Beneficial (NB)

Table 4. Distribution of Respondents on Challenges of Practicing Nutrition-Sensitive Agriculture

CHALLENGES	VS (%)	S (%)	NS (%)	NP (%)	Mean	Standard dev.	Rank
Inadequate access to nutrition-sensitive advisory services	16 (16.0)	37 (37.0)	34 (34.0)	13 (13.0)	2.56	0.91	7 th
Lack of knowledge/training on nutrition-sensitive agriculture	72 (72.0)	10 (10.0)	10 (10.0)	8 (8.0)	3.46	0.97	3 rd
High cost of inputs (seeds, fertilizers)	77 (77.0)	14 (14.0)	5 (5.0)	4 (4.0)	3.64	0.75	1 st
Poor access to improved crop varieties	19 (19.0)	56 (56.0)	18 (18.0)	7 (7.0)	2.87	0.79	6 th
Inadequate government supports	63 (63.0)	26 (26.0)	6 (6.0)	5 (5.0)	3.47	0.82	2 nd
Lack of credit/finance	36 (36.0)	47 (47.0)	8 (8.0)	9 (9.0)	3.10	0.89	5 th
Poor market access for selling diversified products	8 (8.0)	38 (38.0)	45 (45.0)	9 (9.0)	2.45	0.77	8 th
Limited access to finance to implement the practices	49 (49.0)	29 (29.0)	14 (14.0)	8 (8.0)	3.19	0.96	4 th
Unpredictable weather conditions or climate change	12 (12.0)	22 (22.0)	43 (43.0)	23 (23.0)	2.23	0.94	9 th

Source: Field Survey, 2025. Very Severe (VS), Severe (S), Not Severe (NS), Not a Problem (NP)