ANALYSIS OF THE ADOPTION OF SAMMAZ 52 MAIZE VARIETY AMONG FARMERS IN NIGER STATE, NIGERIA

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ABSTRACT

This study analysed of the adoption of SAMMAZ 52 maize variety among farmers in Niger State, Nigeria. Objectives of the study were to: assess the rate of adoption SAMMAZ 52 variety among farmers in the study area; examine SAMMAZ 52 production practices adopted by farmers in the study area; and assess the reasons for adoption of SAMMAZ 52 in the study area. Multi-stage sampling technique was used to 360 respondents for the study. The average age of the farmers was 35.8 years. Most (92.0%) of them were male, while 92.6% were married. Majority (62.0%) of the farmers had primary education with an average farming experience of 6 years. Average farm size was 3.1 hectares. Most (69.0%) of the farmers had access to credit while 67.5% of farmers had extension contact. The study showed that 84.3% of the farmers adopted SAMMAZ 52 variety while majority (91.1%) of them used between 1-3 hectares to cultivate the crop. About 29.3% of the respondents tested their soil before cultivation, while 26.5% of them practiced zero tillage on their farms. Also, 33.5% of the farmers dressed their seed before planting, while 37.1% of them planted 1 seed per hole with a spacing of 75cm x 25cm. More than half (56.8%) of the respondents planted in early April, while 87.5% and 88.0% practiced chemical and manual weed control methods, respectively. About 55.8% applied NPK 2:1:1 on their farms while the majority (86.0%) of them used chemicals to control pests. The most dominant reason (28.5%) for adopting the variety among the farmers was its health benefits. It was recommended that agricultural extension workers should be equipped with adequate resources and training to provide continuous technical support to farmers on best practices for growing SAMMAZ 52 variety.

Keywords: Adoption, SAMMAZ 52, Maize Farmers

INTRODUCTION

Globally, maize (*Zea mays*) ranks as one of the most vital cereal crops after rice and wheat. Africa accounts for approximately 30% of global maize consumption, with Sub-Saharan Africa responsible for 21% of this consumption, with 14 African countries heavily depending on maize as their staple food, consuming about 85–95% of their maize output (Asibe, Ngegba, Mugehu and Afolabi, 2023). In Sub-Saharan Africa, maize serves as the primary staple food for the majority, playing a crucial role in food security and economic livelihoods, particularly in rural areas. Its popularity and productivity have witnessed substantial growth, largely due to increased government support and investments in the African agriculture sector.

The maize's adaptability to year-round cultivation under varying weather conditions makes it a crucial food security crop across various African regions. It also plays a vital role in generating income for numerous households who heavily rely on agriculture. The primary drivers behind the escalating maize production include a growing population, which exacerbates food scarcity and increases demand, especially from sectors such as animal feed (Mulungu and Ng'ombe, 2021).

According to Oladitan, Shittu and Adegbite (2020), beyond being a staple grain, maize is an essential component of animal feed and a major source of raw materials for industries producing starch, syrup, and oil. Millions of smallholder farmers benefit financially and employment-wise from maize production, promoting rural livelihoods and poverty reduction.

Institutions like the Institute for Agricultural Research (IAR) at Ahmadu Bello University (ABU) Zaria and the International Institute for Tropical Agriculture (IITA) Ibadan have developed and released several open-pollinated maize varieties (OPV), including SAMMAZ 38, SAMMAZ 39, SAMMAZ 43, and SAMMAZ 52. Among these, SAMMAZ 52 stands out as an improved open-pollinated maize variety, resulting from extensive research and breeding efforts. It offers potential benefits for farmers seeking increased yields, disease resistance, drought tolerance, and enhanced Pro-Vitamin A content (9.8 µg/g). Adaptable to local agro-ecological conditions, SAMMAZ 52 has the potential to transform maize cultivation and boost farmers' incomes (Sani and Kemaw, 2019).

The broad objective of the study is to assess the adoption of SAMMAZ 52 variety among farmers in Niger State, Nigeria. The specific objectives are to:

i. describe the socio-economic characteristics of the farmers adopting SAMMAZ 52 variety in the study area.
ii. assess the rate of adoption of SAMMAZ 52 variety among farmers in the study area.
iii. examine SAMMAZ 52 production practices adopted by farmers in the study area.
iv. ascertain reasons for adopting SAMMAZ 52 variety among farmers in the study area.

METHODOLOGY

Study Area

Niger State, located in the North-Central region of Nigeria, was created in 1976 following the split of the former North-Western State. It is the largest state in Nigeria in terms of landmass, covering approximately 74,244 square kilometers, which accounts for about 8% of the total land area of the country. The state lies between latitudes 3°20′ and 7°40′ North and longitudes 8°00′ and 11°30′ East. Niger State is predominantly agrarian and is richly endowed with both human and natural resources. The state has vast arable land and a favorable climate, which support the cultivation of a wide range of agricultural crops. Major crops grown include maize, millet, sorghum, rice, yam, cassava, cowpea, groundnut, and Bambara nut. The state also supports livestock production, fishing, and agro-allied activities.

Sampling Technique

A multi-stage sampling procedure was used to sample maize farmers for the study. Stage one involved the selection of the three (3) agricultural zones from the state. The second stage was the selection of two (2) Local Government Areas (LGAs) from each agricultural zone based on their high level of maize production, making a total of six (6) LGAs. Stage three involved the random selection of three (3) extension blocks from each Local Government Area, resulting in a total of eighteen (18) extension blocks. Stage four involved the selection of two (2) cells from each extension block, making a total of thirty six (36) cells. Finally, ten (10) maize farmers were sampled from each cell, making a total of 360 maize farmers for the study.

Data Collection and Analysis

Primary data were collected using a well-

structured questionnaire that included both open- and closed-ended questions. It was designed based on the objectives of the study and supported by relevant literature. The questions were arranged in a simple order to make them easy to understand and answer. The questionnaire was also pre-tested on a few farmers to correct any unclear parts before the final copy was administered by the researcher with the help of trained enumerators who are familiar with the locality.

Objectives of the study were realized using descriptive statistics (frequency, distribution, percentages, and mean). The data collected from the field were analyzed using IBM SPSS 25 Statistical Software. After analysis, the research findings were categorized based on the research objectives and presented through the use of tables.

RESULT AND DISCUSSION

Socio-Economic Characteristics of Maize Farmers in the Study Area

The result in Table 1 shows that majority (39.4%) of the respondents fall within the 31–40 age bracket, with a mean age of 35.8 years. This suggests that maize farming in the state is dominated by relatively young and economically active individuals, which is advantageous for productivity as younger farmers tend to be more innovative and receptive to modern agricultural technologies (Adekunle, Oladipo and Oloruntoba, 2020). The low percentage (4.3%) of farmers above 51 years indicates that older individuals participate less in maize farming, possibly due to the physical demands of the occupation.

Most farmers are male (92.0%), while females constitute only 8.0%. This aligns with previous studies (Bako, Salau & Umar, 2021) which indicate that agriculture, particularly maize farming, is male-dominated in Nigeria due to land ownership constraints and socio-cultural roles that limit women's participation. Most farmers (92.6%) are married, while singles (6.5%) and divorced individuals (0.9%) form a small proportion. Married farmers may have family labor advantages, which contribute to farm productivity (Alabi, Fapojuwo and Alabi, 2019). Household responsibilities could also motivate them to seek better farming practices and income opportunities.

A significant proportion (62.0%) of the farmers attained primary school education, while only 8.4% had tertiary education. About 10.2% had no formal education. Education plays a critical role in the adoption of improved agricultural practices (Sennuga, Baines, Conway and Angba 2020). The relatively low level of higher education among farmers may hinder the adoption of modern farming techniques and innovations. The majority (69.7%) of farmers have 1–3 years of farming experience, while only 1.4% have over nine years of experience. The mean farming experience of 6 years suggests that many farmers are relatively new to maize farming. This could imply limited exposure to best practices, although younger farmers are often more open to innovation and extension services. About 50.4% of the farmers belong to agricultural associations, while 49.6% do not. Membership in farmer organizations is essential for accessing inputs, credit, and extension services (Patel, Devi, Kumar and Karmur, 2024). The near-equal distribution suggests that awareness or benefits of group membership may not have been fully recognized among maize farmers in the study area.

Most farmers (65.5%) operate on small farms (1–3 hectares), with a mean farm size of 3.1 hectares. Only 3.7% of farmers cultivate more than 7 hectares. Small farm sizes are typical among Nigerian smallholder farmers, often due to land tenure issues and financial constraints (FAO, 2021). Limited farm size can affect economies of scale and productivity. The majority (65.6%) have a household size of five or fewer members, with a mean household size of 5. Larger household sizes could mean more

family labor but also greater dependency ratios, potentially impacting farm profitability (Lowder, Skoet and Rayner, 2016).

The income distribution shows that 37.0% of farmers earn between ₦100,001 and ₦500,000 annually, with a mean income of ₦707,336.39. This indicates that maize farming contributes significantly to household income but may still be insufficient to elevate many farmers above the poverty line, considering rising production costs and market price fluctuations (IFAD, 2020). About 69.0% of maize farmers have access to credit, while 31.0% do not. Credit access is crucial for investment in improved inputs and technology. However, the remaining 26% who lack credit access may struggle with farm expansion and productivity. A significant proportion (67.5%) have received extension services, while 32.5% have not. Extension contact is vital for the dissemination of improved farming practices and technology adoption. The high rate of extension service access is positive but needs further strengthening to reach all farmers.

Table 1: Socio-Economic Characteristics of Maize Farmers in Niger State

Variables	Frequency	Percent	Mean
Age			
"	8	2.3	
21 – 30	93	26.2	
31 – 40	140	39.4	35.8
41 – 50	97	27.3	
"	17	4.8	
Sex			
Male	310	92.0	
Female	27	8.0	
Marital Status			
Single	22	6.5	
Married	314	92.6	
Divorced	3	0.9	
Educational Level			
No formal education	35	10.2	
Primary school	214	62.0	
Secondary school	67	19.4	
Tertiary school	29	8.4	
Years of Farming			
1-3	248	69.7	
4-6	94	26.4	6.
7-9	9	2.5	
>9	5	1.4	
Membership of Association			
Yes	177	50.4	
No	174	49.6	
Farm Size			
1-3	224	65.5	
4-6	105	30.8	3.1
7-9	13	3.7	
Household Size			
≤ 5	236	65.6	5
6 – 10	110	31.0	
11 – 15	13	3.4	
Income			
≤100,000	58	15.0	
100,001-500,000	147	37.0	
500,001-1,000,000	114	29.0	707,336.39
>1,000,000	75	19.0	
Access to Credit Facilities			
Yes	231	69.0	
No	104	31.0	
Extension Contacts			
Yes	270	67.5	
No	130	32.5	

Adoption of SAMMAZ 52 Variety in the Study Area

Table 2 revealed that **84.3%** of surveyed farmers in **Niger** reported adopting this variety. This suggested that SAMMAZ 52 is widely accepted among farmers in these states, likely due to its agronomic benefits such as **high yield potential, drought tolerance, or pest resistance** (Nuhu and Ibirinde, 2024). Most adopters (91.1%) cultivated **1-3 hectares**, while a smaller proportion (8.9%) used **4-6 hectares**.

Table 2: Rate of Adoption of SAMMAZ 52 Maize Variety Among Farmers in the Study Area

Adopted SAMMAZ 52 variety	Niger	
	Frequency	Percentage
Yes	337	84.3
Quantity of land used for cultivating SAMMAZ 52		
<1	0	0
1-3	296	91.1
4-6	29	8.9

Source: Field Survey, 2024

Adoption of SAMMAZ 52 Production Practices by Maize Farmers in the Study Area

The adoption of production practices for SAMMAZ 52 in the study area presented in Table 3 shows significant variations across different farming activities. These variations highlight differences in farmer awareness, access to inputs, and possibly environmental or institutional influences. The adoption of soil testing was adopted by 29.3%, 26.5% of them adopted zero tillage, and only 11.1% of the farmers adopted minimum tillage. **The study further showed that pre-planting seed dressing was adopted by** 33.5%. According to Sharma, Singh, Kumar and Sharma (2020), seed dressing helps protect crops from pests and diseases.

About 49.8% of them planted 2 seeds per ridge with a spacing of 75cm x 50cm. Early April planting is a common practice as indicated by 56.8% of the responses. Early planting is beneficial for maize, as it allows crops to maximize rainfall, suggesting that the farmers are responsive to climatic conditions (Jia, Sun, Mou, Ali, Liu, Zhang amd Jia, 2018). The study further revealed a high usage of herbicide as indicated by 87.5%. The recommended NPK 2:1:1 (120:60:60) ratio was adopted by 55.8% of the respondents. Meanwhile only 7.0% of the farmers embraced the use of urea. Majority (86.0%) of the farmers practiced chemical pest control while 14.0% of them use cultural methods. Those who adopted integrated pest management (IPM) system made up 28.0% of the respondents.

Table 3: Adoption of SAMMAZ 52 Production Practices by Maize Farmers in the Study Area

Production Practices	Frequency	Percentage
soil test		
Yes	117	29.3
Land Preparation Methods		
Zero tillage	106	26.5
Minimum tillage	44	11.0
Pre-Planting Dressing of Seed		
Yes	134	33.5
Spacing		
75cm x 25cm (1 seed per hole)	45	11.3
75cm x 50cm (2 seeds per hole)	199	49.8
Planting		
Early April	227	56.8
Late May		
Early June	121	30.3
Weed Control		
Use of herbicide	350	87.5
Manual weeding	352	88.0
Fertilizer Application		
NPK 15:15:15	23	5.8
NPK 2:1: 1(120 ; 60 ;60)	223	55.8
Urea	28	7.0
Organic manure		
Pest Control		
Chemical Control Methods	344	86.0
Cultural control method	56	14.0
Biological control method	54	13.5
Integrated pest management	112	28.0

Source: Field Survey, 2024

Reasons for Adopting SAMMAZ 52 Variety in the Study Area

Table 4 showed the reasons farmers adopted SAMMAZ 52 variety in the study area. Health benefits were the most cited reason for adoption in both states, as revealed by 28.5% of the farmers. This suggested that farmers are becoming more conscious of the nutritional value of maize varieties. Studies such as Ekpa, Palacios, Kruseman , Fogliano and Linnemann, (2018) have highlighted that bio-fortified and nutritionally rich maize varieties are increasingly favoured in developing regions due to rising awareness of food security and health implications.

About 19.5% of them stated that good grain quality was a significant adoption factor, implying that farmers value maize that produces high-quality grains suitable for consumption and processing. High yield potential was another stronge motivating factor for the farmers as indicated by 22.6%. This aligned with research indicating that yield potential is often a key determinant of technology adoption in agriculture (Yokamo, 2020). Similarly, 24.2% revealed that adaptability to local conditions was another reason why the farmers adopted the variety. This suggested that SAMMAZ 52 is perceived as well-suited to different farming environments. Also, 20.3% of the farmers revealed that the ability of SAMMAZ 52 to resist pests/diseases and drought tolerance influenced their adoption. Abate, Fisher, Abdoulaye, Kassie, Lunduka, Marenya and Asnake (2017) noted that resistance to biotic stresses is a critical determinant in maize variety selection. The result further showed that 18.0% of the farmers adopted the variety due to its perceived high marketability.

Table 4: Reasons for Adopting SAMMAZ 52 Variety in the Study Area

Reason for Adopting SAMMAZ 52 Maize Variety	Niger	
	Frequency	Percentage
Health benefits	114	28.5
Good Grain Quality	78	19.5
Medium Maturity (100 – 110days)	68	17.0
High yield potential	90	22.6
Adaptability to Local Conditions	82	20.5
Pest/Disease Resistance and Drought tolerance	81	20.3
Marketability	72	18.0
Consumption Purpose	92	23.0
Colour	48	12.0

Source: Field Survey, 2024

CONCLUSION AND RECOMMENDATION

The study revealed that maize farming in the area is dominated by young, economically active individuals. Most farmers had only primary-level education, relatively short farming experience, and operated small farm sizes, which reflects the typical profile of smallholder farmers in Nigeria. Although the majority of respondents had access to extension services and credit, further outreach is needed to enhance inclusiveness and sustained impact.

The study found a high adoption rate of the SAMMAZ 52 variety, driven by factors such as health benefits, high yield potential, adaptability to local conditions, and pest/disease resistance. However, the adoption of recommended production practices varied widely. While herbicide use and chemical pest control were common, practices like soil testing, seed dressing, proper fertilizer application, and integrated pest management were less widely adopted, indicating gaps in knowledge transfer

and resource availability. Overall, the study highlights that while SAMMAZ 52 has been widely embraced due to its agronomic and nutritional advantages. It was therefore recommended that:Agricultural extension workers should be equipped with adequate resources and training to provide continuous technical support to farmers on best practices for growing SAMMAZ 52 variety. Farmers should be encouraged to adhere strictly to production practices, including proper spacing, fertilizer application, and pest control methods, to maximize yield.

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