



**ADOPTION OF HYBRID MAIZE PRODUCTION AMONG FARMERS IN SABON-GARI
LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA**

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ABSTRACT

The study examines the adoption of hybrid maize production among farmers in Sabon-Gari Local Government Area (LGA), Kaduna State, Nigeria. Multi-stage sampling technique was used in selecting 108 respondents from the study area. Data were collected using questionnaires and analyzed using frequency counts, percentages and mean. The results revealed that the mean age, household size and farming experience of the respondents were 39.8 years, 5 people and 11 years, respectively. The results also revealed that majority (67% and 61%) sourced their information through contact farmers and extension agents, while most (94%) got it from cooperative societies. It was discovered that higher yields and early maturity were important factors that increase adoption rate and that farmers were interested in economic gains while challenges include high cost of labour, lack of high quality seed, low price of grain and high price of fertilizer. The study concluded that yield, taste and price of the maize were the varietal attributes influencing adoption of hybrid maize in the study area. It was therefore recommended that farmers should be encouraged to form cooperatives society which will enable them source credit and other farm inputs. Government should ensure that subsidized agricultural production inputs such as fertilizer, improved seeds and also mechanized farm implements reach the farmers at approved rate/prices.

Keywords: Adoption, Hybrid, Maize, Production, Farmers

INTRODUCTION

Maize, botanically known as *Zea mays* was introduced through the West African Coast about five centuries ago and presently been the most dominated cereal crop in all parts of Nigeria and is one most important food and industrial crops in Nigeria. It has established itself as a very significant component of the farming system and it partly determines the cropping pattern of the predominantly peasant farmers in Nigeria (Abdullahi & Danwanka, 2019). In Nigeria, about 4.5 million tones was produced in the country from 3.5 million hectares of land in 1983 with the Guinea savanna accounting for 70% of this total production (Ewenzor *et al.* 2011).

The Federal Ministry of Science and Technology (2014) reported that Nigeria has a wealth of improved maize varieties and management technologies that can double or triple traditional yields. Early maturing, drought and disease resistant, high yielding varieties of maize offer exciting new possibilities for multiple cropping in the future. The source of improved varieties are the National Seed Service, the relevant research institutes, state agricultural supply companies, seed companies and other agro-allied retailers.

Improved agricultural practices are farming practices that have been researched on, tried and found to bring about increased crop yield (Abayomi *et al.*, 2016). The practices include use of certified seed, use of fertilizer and manure for planting and top-dressing, and correct use of pesticides for pest and diseases control among others. An estimated 5,622,000 metric tonnes of maize was produced between 2007 and 2014 in Kaduna State (NAERLS & FDAE, 2014).

Furthermore, it has been found from demonstration conducted by IITA, National Rice/Maize Centre and Sasakawa Global SG2000 among others that yield levels of more than 3ton/ha are



achievable with the use of improved seeds, pesticides and adequate fertilizer application (Ajala, 2018). The way out of low productivity of maize is the adoption of improved seeds with other packages that go with the technology. However, production and use of improved seed depends on the availability of the improved, high yielding and well-adapted varieties (Onu *et al.*, 2016).

One of the problems militating against the use of improved seeds by farmers is the non availability of the improved seeds since their production were originally done by the few big commercial farms that are unable to produce enough to go round. The exclusive production of these seeds by big farms also made small farmers to consider improved seeds as foreign activities that are not made for their type of farming activities and participation.

To solve this problem, many seed companies have engaged the services of rural farmers in Kaduna State in the production of improved seeds of various grains but maize grains in particular. This is a wise decision since this arrangement will also serve as an extension activities thereby exposing not only the farmers involved but other farmers in the same locality to the advantages offered by the adoption of these improved seeds by participating farmers. It is also hoped that the involvement of local farmers in the production of this hybrid seed will remove the erroneous belief that its production is the exclusive preserved of the rich farmers and will consequently encourage availability of the seed to desiring rural farmers as well as its policy implication for food security in the country as well as the West African sub-region. This study attempts to examine adoption of hybrid maize production among farmers in Sabon-Gari Local government Area, Kaduna State and the impact of the participation on farmers' productivity in the area.

Despite decades of agricultural policies that promoted the adoption of fertilizer and hybrid seed technologies as ways of improving maize productivity in the agricultural sector, there have been low rate of adoption of improved seeds among farmers in Sabon-Gari Local Government Area, Kaduna State. According to the Kaduna State Ministry of Agriculture of 2022/23, only 9.7% of maize farmers and 6.7% of paddy maize farmers in Kaduna State used improved varieties of the crops together with fertilizer. The few farmers who used improved maize and rice varieties with fertilizer obtain significantly higher yields than those who used unimproved varieties (Ministry of Agriculture, 2022).

One wonders why the adoption of improved seeds is still so low, despite the fact that suppliers of hybrid maize seeds have been increasing and there is low production of maize in Sabon-Gari area of Kaduna State. Moreover, non-adoption of improved maize production practices negatively affects maize production in the study area. Hence, the general objective of this study is to examine the adoption of hybrid maize production among farmers in Sabon-Gari Local Government Area of Kaduna State, whereas the research work was specifically aimed at addressing the following objectives:

- (i) describe the socio-economic characteristics of the maize farmers in the area;
- (ii) identify the sources of information on hybrid maize seed among farmers;
- (iii) examine the factors influencing adoption of hybrid maize seed among farmers,
- (iv) describe the constraints to adoption of hybrid maize seed in the study area.

METHODOLOGY

Area of the Study

This study was carried out in three wards located in Sabon-Gari Local Government Area (LGA) of Kaduna State. The entire Kaduna State is located between Latitude 100 and 110 31' N and Longitude 70 30' and 90 E of the prime Meridian. The State is located within the Savannah ecological region of Nigeria and the vegetation of the entire state falls within the Guinea Savannah zone. The state has an estimated population of 6,869,255 million according to 2006 National Population Census. Sabon-Gari LGA is one of the 23 local government areas. The LGA is bordered with Giwa in the East, Makarfi in the North, Zaria in West and Igabi LGAs in the South. With an estimated land area of 43,0002 Km (i.e. about 4.3 million ha), the state has a cultivable area of about 3.44 million ha while the total area of about 3.223 million ha is presently being cultivated (Anonymous, 2014).



Sample Size and Sampling Technique

Multi-stage sampling technique was adopted to select the sample for this study. The first stage involved the purposive selection (based on the high prevalence of maize farmers) of four (4) wards out of the thirteen (13) wards in the L.G.A. These wards were Muchiya, Basawa, Bono and Dogarawa. The second stage involved random selection of two (2) villages under each ward selected. This gave a total of eight villages viz: Anwgar Gabas, Dogon-awo, Gidan Alhaji, Kukoki, Anguwar-sarki, Nasarawa, Hayin Sarki and Tashar-hasan. From the eight (8) villages selected, proportionate random sampling of 10% of the total number of maize farmers (1029) was carried out to select the actual respondents (108) for this study as shown in Table 1.

Table 1: Sampling Frame and Size

S/No	Name of Wards	Villages	Population	10% Sample Size
1.	Basawa	Anwgar Gabas	146	15
		Hayin Sarki	97	11
2.	Bono	Dogon-awo,	135	14
		Gidan Alhaji	176	19
3.	Dogarawa	Kukoki,	128	13
		Anguwar-sarki	95	10
4.	Muchiya	Nasarawa	116	12
		Tashar-hasan	136	14
Total			1029	108

Method of Data Collection

A structured questionnaire was used as a research instrument for the collection of primary data. The items on the questionnaire were structured on a modified Likert type 4 – point Scale weighted as follows: Strongly Agree (SA) – 4, Agree (A) – 3, Disagree (D) – 2 and Strongly Disagree (SD) – 1.

Methods of Data Analysis

Descriptive statistical tool will be used to answer the research questions. Data collected were analyzed using frequency distribution, mean score (\bar{X}) and grand mean. This was used in answering the research questions. Only the mean score of 2.50 and above was accepted showing strong agreements with the statements while mean score below 2.50 showed disagreement with the statements.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

The results from Table 2 revealed that more than half (55%) of the hybrid maize farmers fell between the ages of 20-49 years, implying that majority of the farmers were within their youthful age. This agrees with similar findings by Abdullahi *et al.*, (2015). The results also showed that numbers of male farmers that adopt hybrid maize production farming stood at 85% indicating the male respondents dominating in hybrid maize farming in the study area. Also, majority (82%) were married and almost all (90%) were literate. The high level of education from among participants predisposes them to high level of awareness and adoption of modern farming techniques. This agrees with Abdullahi *et al.*, (2023) who reported that literacy is related to the degree or level of acceptance and subsequent adoption of improved farming technology.

The results further revealed that majority (72%) had household size ranging from 1-9 household members which implies that the farmers in the study area might have advantage of family labour availability if many household members participate in farms. The results therefore imply that maize farmers under hybrid in Sabon-Gari LGA could rely on family labour which agrees with Abdullahi *et al.*, (2015). Also, about 65% had more than 6 years experience in maize farming. This could be that people are gradually moving back to agriculture as a source of livelihood. If that be the case, the country's GDP will increase by reducing importation of various food items and increasing exportation. Furthermore, about 48% of respondents had 3-4 hectares of land which implies that size



of farm contributes to household income in the study area. It was discovered that 58% of the small scale farmers participating in the Growth Enhancement Support Scheme (GESS) are involved in different cooperative societies while the remaining 42% were on the contrary. This result is in line with Adamu *et al.* (2013) and Ogbonna and Nwaoblala (2014) who reported that maize and rice farmers are small scale farmers with average land holdings of 2-4ha

Table 2: Distribution of Respondents According to Socioeconomic Characteristics

Age (Years)	Frequency	Percentage	n = 108
20-29 yrs	9	8	
30-39 yrs	18	17	
40-49 yrs	32	30	
50-59 yrs	28	26	
60 yrs & above	21	19	
Sex (Gender)			
Male	92	85	
Female	16	15	
Marital Status			
Single	12	11	
Married	88	82	
Widow/Widower	8	7	
Educational Attainment			
Non formal education	16	15	
Primary education	38	35	
Secondary education	42	39	
Tertiary education	12	11	
Household Size			
Less than 3	46	42	
4-6	18	17	
7-9	32	30	
10 & above	12	11	
Farming Experience			
1- 5 years	38	35	
16-30 years	44	41	
31 years & above	26	24	
Farm Size in Hectares			
Less than 1 Hectares	8	7	
3-3 Hectares	20	19	
3-4 Hectares	52	48	
5 Hectares & above	28	26	

Source: Field survey, 2024

Source of Information on Hybrid Maize Seeds to Farmers

The results from Table 3 showed that 67% of the respondents source their information through fellow farmers whereas 61% got their information from extension agents as against 94% respondents whose source of information was through cooperatives. However, it was noted from the table that 61% of the sampled population do not attend seminar and workshops on hybrid maize seed farming in the studied area.

Onu *et al.* (2016) found that small-scale farmers preferred homophilous source of farm communication and would thus, rely on them for needed innovations. The most preferred sources in rank order according to Onu *et al.* (2016) were neighbours, relatives, opinion leaders and extension agents.



Table 3: Distribution of Respondents According to Source of Information on Hybrid Maize

S/No	Items	Yes		No		Total
		Freq.	%	Freq.	%	
1.	Fellow farmers	72	67	36	33	108 (100)
2.	Extension Agents	66	61	42	39	108 (100)
3.	Agricultural Shows	58	54	50	46	108 (100)
4.	Seminars/Workshops	42	39	66	61	108 (100)
5.	Television	64	59	44	41	108 (100)
6.	Radio	81	75	27	25	108 (100)
7.	Newspapers	60	56	48	44	108 (100)
8.	Co-operative Society	102	94	4	6	108 (100)

Source: Field survey, 2024

Factors Influencing Adoption of Hybrid Maize Seed

Table 4 reveals that all the items scored above 2.50 indicating a strong agreement with the statements by the respondents. The grand means of 3.55 shows that the responses were strongly acceptable indicating the extent to which hybrid maize seeds played important roles in the adaptation among the studied population. This can be utilized effectively for the increase in the production of maize farming in Sabon-Gari LGA, Kaduna State, Nigeria. The results revealed that majority of the respondent asserted that using hybrid maize seeds yields are very important (3.86), taste and grain quality is different (3.79), matured early (3.80), seed availability and value (3.80) while hybrid maize seed is superior (3.11). This finding is in line with the finding of Abdullahi *et al.*, (2023). Similarly, Ouma *et al.* (2016) finding shows that hybrid maize seeds yields are very important, taste grain quality is different, matured early, seed available and value while hybrid maize seed is superior.

Table 4: Distribution of Respondents on Factors Influencing the Adoption of Hybrid Maize Seeds

S/N	Item	SA	A	D	SD	Mean	Decision
0							
1.	Yields are important when using hybrid maize seed	(95) 3.52	(10) 0.28	(3) 0.06	(0) 0	3.86 3.86	Agree
2.	Taste and grain quality of hybrid maize is different	(85) 3.15	(23) 0.64	(0) 0	(0) 0	3.79	Agree
3.	Early maturity is a more common when using hybrid maize	(86) 3.19	(22) 0.61	(0) 0	(0) 0	3.80	Agree
4.	Price is not a limiting factor for adoption for hybrid maize seed	(60) 2.22	(46) 1.28	(2) 0.04	(0) 0	3.54	Agree
5.	Maize farmers access hybrid maize seed because of the availability of information in their area	(77) 2.58	(30) 0.83	(1) 0.01	(0) 0	3.42	Agree
6.	High rate of adoption of hybrid maize seeds among farmers is attributed to availability of agro-inputs dealers in farmers' areas	(38) 1.41	(64) 1.78	(4) 0.07	(2) 0.02	3.28	Agree
7.	Farmers adopt hybrid maize seeds because of their value markets	(88) 3.26	(19) 0.53	(1) 0.01	(0) 0	3.80	Agree
8.	Improved maize and rice seeds present too complex task to implement in the farm	(94) 3.48	(11) 0.31	(3) 0.06	(0) 0	3.85	Agree
9.	Hybrid maize improved seeds present the superiority in terms of yield than local variety	(22) 0.81	(80) 2.22	(2) 0.04	(4) 0.04	3.11	Agree
10.	Farmers prefer local maize seed because of its accessibility and availability	(45) 1.67	(59) 1.64	(2) 0.04	(2) 0.02	3.37	Agree
Ground Mean = 3.55							

Source: Field survey, 2024

Constraints to Adoption of Hybrid Maize Seed

The results in Table 5 showed that all the items indicated significantly marred the adoption of hybrid maize seeds in the study area. Also, the grand mean of 3.33 showed that the responses were strongly acceptable which indicated various constraints to the adaptation of hybrid maize seed by farmers in the study area. High cost of labour (3.79), inadequate market accessibility (3.66), inadequate capital (3.56) and lack of agricultural extension services (3.49) were among the most pressing constraints. This finding is in line with the finding of Ouma *et al.* (2016).



Table 5: Distribution of Respondents based on Constraints to Adoption of Hybrid Maize Seed.

S/No	Item	SA	A	D	SD	Mean	Decision
1.	Inadequate capital	(62) 2.30	(44) 1.22	(2) 0.04	(0) 0	3.56	Agree
2.	High cost of labour	(88) 3.26	(17) 0.47	(3) 0.06	(0) 0	3.79	Agree
3.	Inadequate market	(79) 2.93	(20) 0.56	(9) 0.17	(0) 0	3.66	Agree
4.	lack of high quality seed	(40) 1.48	(58) 1.61	(10) 0.19	(0) 0	3.28	Agree
5.	low price of grain	(20) 0.74	(86) 2.39	(2) 0.04	(0) 0	3.17	Agree
6.	Lack of agricultural extension services in the area	(55) 2.04	(50) 1.39	(3) 0.06	(0) 0	3.49	Agree
7.	High price of fertilizers	(30) 1.11	(73) 2.03	(3) 0.06	(2) 0.02	3.22	Agree
8.	Poor infrastructural facilities	(22) 0.81	(52) 1.44	(20) 0.37	(14) 0.13	2.75	Agree
9.	Destruction of plant by storm, drought and flood	(19) 0.71	(68) 1.89	(12) 0.22	(9) 0.08	2.90	Agree
10.	Lack of suitable land	(42) 1.56	(51) 1.42	(10) 0.19	(5) 0.05	3.22	Agree
11.	Incidence of pest and diseases	(40) 1.48	(64) 1.76	(3) 0.06	(1) 0.01	3.31	Agree
Ground Mean		33.3					

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

1. Considering the findings of this study, it was concluded that yield, taste and price of the maize were the varietal attributes influencing adoption of hybrid maize in the study area. The results have clearly demonstrated that farmers decision making were based on varietal attributes. It also demonstrated that farmers were interested in economic gains, whereas high cost of labour, lack of high quality seed, drought and flood and pest and diseases, financial constraints and the non-availability of hybrid varieties were some constraints identified by the maize farmers of Sabon-Gari LGA of Kaduna State.

On the basis of findings and conclusions, the following recommendations were made:

1. Farmers should be encouraged to form cooperatives, as cooperative society is very important for farmers as this is a source for credit and other farm inputs. Also for the purpose of cheaper and quicker information dissemination on new improved technologies.
2. Government should ensure that subsidized agricultural production inputs such as fertilizer, improved seeds and also mechanized farm implements reach the farmers at approved rate/prices (i.e. government should ensure little or no corruption in disbursement of subsidized production input).



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