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Farmer's Knowledge and Adoption of Improved Varietis in Groundnut Production in Bauchi State

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ABSTRACT: The study assessed the farmer's knowledge and adoption of improved groundnut varieties in Bauchi State. Specifically; describe the socio-economic characteristics of groundnut farmers, assess the level of awareness of improved groundnut varieties, assess the level of adoption of improved groundnut variety and determine the factors influencing the adoption level. A descriptive survey research design was adopted for the study. A multi-stage sampling technique was used in selecting 256 respondents, and data were collected through a structured questionnaire, which was validated by experts and a reliability coefficient alpha value of 0.82 was obtained, using Cronbach's alpha.

Descriptive statistics of frequencies, percentages, means and standard deviation and chi-square tests were employed to analyze the data. The findings revealed that the majority of farmers were male and between the ages of 31 and 40, with the majority having completed secondary education. The result indicates the dominance of smallholder groundnut farmers in the area, as well as the farmers' land ownership, which is predominantly (87.8%) owned by them. The Farmers indicated awareness of improved groundnut varieties, and a large proportion of respondents were late majority adopters. The socio-economic characteristics variables that were statistically significant at the 95% confidence level were age group and education level. The study concluded that groundnut farmers in the study area were fully aware of the improved groundnut varieties, and that they were the late majority in terms of adoption. Also, the demographics of age and education level influenced respondents' adoption levels. To ensure that the remaining few farmers are knowledgeable, the ADP Agricultural Extension Unit should intensify its awareness campaign about agricultural technology transfer.

KEYWORDS: Farmers, Knowledge, Adoption, Improved Varieties and Groundnut Production

INTRODUCTION

Groundnut (Arachis hypogaea L.) has become an important crop, providing protein, vitamins, and cooking oil. Groundnut, as a cash crop, makes a substantial contribution to smallholder farmers' livelihoods by providing income for food security, education, and healthcare. Historically, Nigeria was one of the world's top groundnut producers and exporters. Groundnuts are the world's 13th most important food crop, the fourth most important source of edible oil, and the third most important source of vegetable protein. (Lawal & Muhammad, 2018). In Bauchi State, groundnut is not only a source of household food and income but also an important driver of rural socio-economic development. Many farming households rely on groundnut sales to finance other livelihood activities such as children's ed$_{ucation,}$ health care, and small-scale trading. Although output has fallen over the years, it is still an important crop with unrealized potential (Ibrahim, 2019). In Bauchi State, groundnut is traditionally cultivated by smallholder farmers who depend on it for both household consumption and market sales.

To address challenges of low productivity and soil degradation, improved groundnut technologies such as improved groundnut varieties like SAMNUT-24, SAMNUT- 26 and SAMNUT- 25 among others. Improved groundnut varieties, on the other hand, are developed to address production constraints such as pests, diseases, and drought, and they often offer higher yields and earlier maturity (Obiora, 2020). Despite these benefits, the level of awareness and adoption among farmers in Bauchi State remains relatively unchanged over years due to poor extension services, cultural preferences for traditional practices, and limited access to inputs (Ibrahim, *et al*., 2023). Many farmers may be aware of these technologies, but lack the funding, technical skills, and confidence to properly use them. Furthermore, the implementation of improved groundnut production procedures is especially important in Bauchi State due to its climatic characteristics. Being located in the savanna zones, the area experiences irregular rainfall and declining soil fertility. These challenges necessitate the introduction of climate-smart technologies such as improved seed varieties and zero tillage practices, which have been shown to improve resilience to drought.

Farmer's Knowledge and Adoption of Improved Varietis in Groundnut Production in Bauchi State

Despite continued efforts to boost groundnut production through the use of improved groundnut varieties, productivity levels among farmers in Bauchi State remain low. Studies in the literature have shown that limited awareness, low adoption, inadequate extension services, and socio-economic constraints hinders the adoption of agricultural technologies (Aliyu, *et al*., 2021; Lawal & Muhammad, 2018). Inconsistent adoption of modern technologies and traditional farming practices dominated rural areas in Bauchi State, thereby reducing productivity and income generation among groundnut farmers (Ibrahim, *et al*,. 2023). Until recently, most of the farmers producing groundnut relied on local seed varieties which gives low outputs. Groundnut yield in Bauchi State used to be low and range between 0.5 to 1.5 tones/hectare compare to its potentials of 2.5 tones/hectare (BSADP, 2020). The introduction of improved groundnut varieties to farmers will help boost yield, which is among the major challenge faced by the farmers.

Therefore, the study assessed farmers' awareness and level adoption of improved groundnut varieties in Bauchi State.

Specifically seeks to; describe the socio-economic characteristics of groundnut farmers in Bauchi State, assess the level of awareness of improved groundnut varieties among farmers in the study area, assess the level of adoption of improved groundnut variety among farmers in Bauchi State, and determine whether socio-economics characteristics of the respondents has significant influence on the their adoption level of improved varieties groundnut.

METHODOLOGY

The study employed a descriptive survey research design. A survey design was considered appropriate because it allowed the collection of data from a sample within a relatively short period.

The study Area is Bauchi State, Nigeria. Is one of the States in North-east zones of Nigeria, the reason for conducting the study in Bauchi State, is because of its high involvement in agricultural activities, particularly groundnut production. Also, the area is located within the savanna ecological zone, which is suitable for the cultivation of legumes such as groundnut. Population of the Study comprises of all the 5,026 groundnut farmers in Bauchi State, these farmers are directly engaged in groundnut cultivation (BSADP, 2024).

A sample of 256 respondents was used in this study, following the Adam (2020) Table for sampling determination, suggested a sample of 257 out of 5000 respondents base on 90% confidence level. The study employed multistage sampling procedure. Firstly, a purposive selection of one agricultural zones out of the three agricultural zones in the state, this was due to the concentration of groundnut production in the zones. Secondly, also, a purposive selection of two Local Governments Areas (Darazo and Ganjuwa) out of the four LGAs in the selected zones, which are Darazo, Ganjuwa, Ningi, and Warji. Thirdly, involved a random selecting of four Wards known for significant groundnut production in the two LGAs making a total of eight wards. Fourthly, two farming villages were randomly selected from each of the eight ward, due to the intensity of groundnut production. Lastly, in each selected villages, 16 groundnut farmers were randomly chosen, making a total of 256 respondents.

Primary data was collected using a structured questionnaire with a rating scale, which was administered and retrieved by the researcher with the help of trained research assistants. The instrument was validated by experts and a reliability coefficient alpha value of 0.82 was obtained, using Cronbach's alpha. The data collected were analysed using descriptive statistics of frequencies, percentages, means and standard deviation to summarize respondents' socioeconomic characteristics and levels of awareness and adoption. While inferential statistics of Chi2 was used to analysed the null hypothesis.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The socio-economic characteristics of the respondents provides a basis for understanding the background factors that influence their knowledge and adoption of improved groundnut varieties.

The results in Table 1 showed that, groundnut production in Bauchi State is dominated by male (67.9%), although women (32.0%) also participate actively. Majority of respondents (44.9%) fall within the age range of 31–40 years, suggesting that groundnut farming is carried out by categories of active youth and middle-aged farmers. In terms of education level, majority (43.7%) of the farmers had secondary education, most (28.9%) had primary education, while few (17.1%) had tertiary education, and only (10.1%) had no formal education. This implied that the groundnut farmers in the area are moderately literate. Also the result indicated that, most farmers (54.2%) cultivated between 1– 2 hectares, while some (23.8%) farmed cultivated less than one hectare, however, few (21.8%) farmers cultivated more than three hectare of land. This reflecting the dominance of smallholder groundnut farmers in the area. The result revealed land ownership of the farmers is largely (87.8%) owning their farmland. While others (12.1%) reported that, they hared the farms. This may go a long way to their willingness to embrace new technologies and their access to productive resources. The finding of the study conformed to the findings of Adebayo *et al.,* (2020) that middle aged farmers were the most active adopters of improved groundnut varieties in Northern Nigeria.

Table 1: Socio-Economic Characteristics of Respondents (N = 75)

Variable	Category	Frequency	Percent (%)
Gender	Male	174	67.9
	Female	82	32.0
Age group	≤30 years	44	17.1
	31–40 years	115	44.9
	41–50 years	61	23.8
	51+ years	36	14.0
Education level	No formal	22	10.1
	Primary	74	28.9
	Secondary	112	43.7
	Tertiary	44	17.1
Farm size	<1 ha	61	23.8
	1–3 ha	139	54.2
	>3 ha	56	21.8
Land ownership	Own	225	87.8
	Rented	31	12.1

Source: Field Survey, 2025

Level of Awareness of the respondents on improved groundnut Varieties

Table 2 presented respondents' awareness of various improved varieties of groundnuts. The results shows that, based on the level of awareness of the respondents all five varieties had mean scores ranges from 3.0 to 1.9 with corresponding standard deviation ranges between 0.71 to 0.25, the grand mean of 2.42, signifying that respondents agreed that they are highly aware of the improved varieties of groundnuts. This could be attributed to the public private partnerships approach used by the State Government and Fadama III project on awareness campaigned for all agricultural technologies. The result agreed with the report of Ibrahim, *et al*,. (2023) that majority of the farmers in Kaduna State were aware of improved cowpea varieties. The finding of the study corroborate the finding of Kadafur et al., (2025) which reported that the farmers in Borno State are highly aware of the improved groundnut varieties of SAMNUT22, 23, 25 among others, in the area as agricultural technologies.

Table 2: Respondents' Awareness of Improved Groundnut Varieties

Improved Varieties	Mean	SD	RMK
SAMNUT-24 Early maturing variety	3.0	0.71	HA
SAMNUT- 26 Rosette resistant variety	2.7	0.43	HA
SAMNUT- 25 Drought tolerant variety	1.9	0.25	A
SAMNUT- 22 Large pods variety	2.4	0.41	HA
SAMNUT- 27 High oil content variety	2.1	0.52	HA
Grand mean	**2.42**	0.46	HA

Source: Field Survey, 2025

Level of Adoption of improved groundnut Varieties among the respondents

Respondents' level of adoption of improved groundnut variety in the study area. The result in Table 3 revealed that only (2.3%) of the respondents adopted the technology instantly from the inception, which are generally refers as innovators, whereas, almost (13.3%) of the respondents adopted after the progressive farmers and leaders advices, which are the Early adopters. The result also showed that, widespread (60.2%) of the respondents were the Early/Late majority, they adopted after verifying the actual result of the technologies. More so some (16.3%) of the respondents are found to be laggards, tend to be traditional farmers adopting only when necessary, however, almost (7.8%) of the respondent does not adopt, since they are no interested at all. These categories are refers to the group of non-adopters. The finding of the study conformed the report which states majority of oil palm farmers were innovators in the use improved seedlings, fertilisers and mechanised technology (Ovwigho *et al.*, 2024).

Table 3: Respondent level of adoption of improved variety of groundnut

Level of Adoption	Freq.	%	RMK
Adopted Instantly as risk-takers	6	2.3	IN
Adopted after the opinion of leaders	35	13.3	EA
Adopted after seeing the proven result	154	60.2	LM
Adopted only when necessary	41	16.3	LG

Not adopting base on traditional belief	20	7.8	NA

Source: Field Survey 2025

KEY: IN= Innovators, EA= Early adopters, LM= Late majority, LG= Laggards, NA= Not adopt

Influence of socio-economics Variable on Adoption of Improved Groundnut Varieties

The result for the influence of socio-economics variable on adoption of improved groundnut variety is presented in Table 4. The analysis showed that several characteristics of the respondents influenced either adoption. Variable that were statistically significant at 95% confidence level include: age group and education level. However, variables sex, farm size and ownership were not significant. This implies that for any increase per unit in each of the independent variables of age and education level could led to a change in the adoption level of the respondents. Based on the analysis, the result revealed a coefficient of determination, the Chi2 value of 0.72 was obtained, implying that about 72% of the adoption level of the groundnut farmers was determined by their socio-economic variables. The finding agreed with the finding of Adebayo et al. (2020) which reported that education level was significant in influencing the adoption of improved cowpea varieties in Savannah of Northern Nigeria and soybean production among male and female farmers in Borno State. Also, the finding corresponds with that of Owolabi et al. (2021) reporting that, farmers with larger farms size will be more willing to devote portion of the land for trials of innovation. The finding also conformed to the report which stated age, education level and membership of organization were the major socioeconomic, institutional, and technology-specific determinants influencing the adoption of agricultural technologies among oil palm farmers in Imo State. (Oduehie, et al,. 2024)

Table 4: Socio-economic Factors Influencing the Adoption of Improved Groundnut Varieties

Variable	Coef.	Std.Err.	z	P>|z	dy/dx
Sex	0.108	0.451	0.732 $_{NS}$	0.030	1.292
Age group	0.015	1.961	0.12	0.055*	2.689
Level of Edu.	0.181	3.759	0.02	0.080***	3.039
Farm size	-0.063	- 4.602	0.651	-0.029	-3.761
Ownership	-0.061	-2.435	0.635 $_{NS}$	-0.016	-2.867
LRchi2(5)	0. 72			0.67.4	
Prob>chi2	25.472*			20.221*	
Pseudo R Square	0. 721				

Source: Field Survey 2025

CONCLUSION

The study concluded that the groundnut farmer in the study area were fully aware of the improved groundnut varieties, and they were found to be late majority in terms of adoption level, who adopted after verifying the actual result. Also variables of age and education level influenced the adoption level of the respondents.

RECOMMENDATIONS

Based on the findings of the study the following recommendations were made;

i. Agricultural Extension Unit of ADP, should increase the awareness campaign for imparting agricultural technologies, so that the remaining few farmers also be aware.

ii. Improved Seeds Producers should be encouraged to use participatory extension approach on groundnut farmers inother to mobilized most farmers to adopt the technologies.

iii. The Government should development a policy which provides adequate involvement of farmers in somedevelopmental and research project, that has the potential of raising adoption to a higher level.

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