



**DETERMINANTS OF THE LEVEL OF SMALLHOLDER MAIZE FARMER'S
PARTICIPATION IN BABBAN GONA FARMER SERVICES IN
KADUNA STATE, NIGERIA**

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ABSTRACT

The study was carried out to determine the factors influencing the level of smallholder maize farmer's participation in Babban Gona farmer services in Kaduna State. Multi-stage sampling procedure was used to select 377 participants for the study in 2017/2018 crop season. Data were collected using structured questionnaires and analysed using descriptive statistics and Tobit regression model. The results revealed that majority of participating farmers were male (92%), married (86.2%), about 93.3% were within the productive age bracket 20-49 years with the mean age, household size and farm size of 34 years, 9 persons and 1.69 ha, respectively. The result of the analysis revealed that there is a very high level of farmer's participation (79.3%), and the farmers had positive perception towards the effectiveness of the programme with threshing services ($\bar{\kappa}=3.38$), fertilizer supply ($\bar{\kappa}=3.19$), access to credit ($\bar{\kappa}=3.17$), transportation ($\bar{\kappa}=3.13$), storage facilities ($\bar{\kappa}=3.12$) and agrochemical application ($\bar{\kappa}=3.01$) were perceived to be moderately effective among the Babban Gona goals. The results also revealed that the estimated coefficient of household size ($\beta = 0.008$; $P<0.01$), level of education ($\beta = 0.022$; $P<0.01$), farm size ($\beta = 0.019$; $P<0.10$) and cooperative membership ($\beta = 0.029$; $P<0.01$) were statistically significant factors influencing level of farmer's participation in Babban Gona Services. The study concluded that household size, education, farm size and membership of cooperatives were the determinants of maize farmers participation in Babban Gona services in the study area. The study recommended that capacity development for field agents on knowledge transfer to farmers should be enhanced. Concerted efforts should be made to extend the services of Babban Gona to female folks.

Keywords: Smallholder, Maize, Participation, Babban Gona, Farmer-services

INTRODUCTION

Nigeria is currently one of the largest producers of maize in the world, and the largest maize producer in Africa (IITA, 2018; Hussaini *et al.*, 2025). It is estimated that 70% of smallholder farmers account for 90% of total farm output (African Development Bank, AfDB, 2023). Maize crop started as a subsistence crop in Nigeria and has gradually risen to a commercial crop on which many agro-based industries depend on as raw materials (Obute *et al.*, 2025). The sustainable development of a larger proportion of rural poor is linked to maize production; being a staple. Maize is one of the important grains in Nigeria, not only on the basis of the number of farmers that engaged in its cultivation, but also in its economic value (Abdullahi *et al.*, 2024). And this points to the significant role of maize production to sustainable development of rural economy, food security and poverty reduction especially in Nigeria (Oyakhilomen *et al.*, 2012; Yakubu *et al.*, 2024). Therefore, participating in farmer groups has the potential to enable smallholder farmers to mobilize productive resources, overcome challenges associated with marketing efficiencies and also minimize cost due to economics of scale.

Farmer's participation in developmental programme/project plays a vital role in economic development and poverty alleviation (Ben Matiwane and Matiwane, 2025). The essential role of the private sector in achieving agricultural growth and prosperity through investment in production, marketing and processing cannot be over-emphasized. Effective private sector participation may overcome the challenges in input and output markets or institutional weaknesses by providing credit, seeds, machinery services, human capital and market access to smallholder farmers.

Babban Gona ("Great Farm" in Hausa) is an agricultural franchise developed by Doreo Partners, an impact investment firm with a proven track record of exclusively investing in profitable,



high growth, early-stage businesses that improve the livelihoods of Nigerian smallholder farmers. Babban Gona inspires and enables hardworking smallholder farmers reach their full potential by providing a private sector channel for cost effective delivery of enhanced agricultural technologies and end to end services that optimize yields and labour productivity, while simultaneously improving market access.

In spite of its economic importance to the vast populace in Nigeria, maize has not been produced to meet food and industrial need of the country. This could perhaps be attributed to low productivity from maize farms or that farmers have not adopted improved technologies that would make maize production profitable. Addressing the challenges facing maize productivity and sustainability is vital to the futures of hundreds of millions of people. Since collaborating with private sector has the potential to improve livelihoods, it is therefore imperative that we understand the factors influencing participation of small holder maize farmers in Babban Gona farmer services. This study intends to answer the determinants of the level of smallholder maize farmer's participation in Babban Gona farmer services in Kaduna State, Nigeria. Specifically, the study described the socio-economic characteristics and determined the level of participation of maize farmers in Babban Gona services, described the perception of farmers towards the effectiveness of Babban Gona services and analyzed the factors influencing farmers' level of participation in Babban Gona services.

METHODOLOGY

The Study Area

The study was carried out in Kaduna State. Kaduna state is located between latitudes 9°03' and 11°32'N of the equator and longitudes 6°05' and 8°38'E of the Greenwich Meridian. The state is located at the Northern part of Nigeria's High Plains. The vegetation cover is Guinea Savannah type, characterized by scattered short trees, shrubs and grasses. Soil type is mostly loamy to sandy type. Substantial amounts of clay are also found. Kaduna state bureau of statistics reported that the state has a total land area of 46,063 square Kilometers and an estimated population of 10.4 million as at 2023.

Agriculture is the main stay of the economy of Kaduna state with about 80% of the people actively engaged in farming (Kaduna State, 2018). The study area has a typical climate characterized by two distinct seasons, dry and rainy seasons. Like in most parts of the Savanna, the rainy season begins in May and ends in September, while the dry season starts in October and ends in April. The area consists of a mixed formation of trees, shrubs and grasses. Mixed cropping is popular among farmers in the area, but sole cropping is also practiced. Maize, sorghum, cowpea, groundnut, soybean and vegetables are the main crops grown in Kaduna state (Ibrahim, 2017).

Sampling Technique and Sample Size

The study utilized maize farmers participating in Babban Gona Franchise in Kaduna state for sampling. A multistage sampling procedure was used for this study. The first stage was the purposive selection of 3 local government areas (LGAs) in the state. These LGAs include; Soba, Ikara and Makarfi. These LGAs were selected because they were the pioneer LGAs of Babban Gona Franchise in the state and they account for about 65% of the total population of member farmers in the state. The second stage was the selection of 5 villages with the highest participating farmers in each of the 3 LGAs. The last stage is simple random sampling of farmers from the selected villages. A total of 377 farmers were selected.

To determine the sample size, the Yamani formula was used. The formula is stated thus;

$$n = \frac{N}{1+N(e)^2} \dots\dots\dots (1)$$

Where, n = sample size, N = Population, and e = margin of error (5%).



Table 1: Distribution of Babban Gona Farmers

LGAs	Sample Frame*	Sample Size
Soba	4959	289
Ikara	789	46
Makarfi	716	42
Total	6464	377

***Source:** Babban Gona Franchise, 2017

Method of Data Collection and Analysis

Primary data were used for this study, and this was obtained through structured questionnaire administered to the selected farmers. Data collected were analyzed using descriptive and inferential statistics. Descriptive statistics used include frequency, mean, percentages and ratios. Likert type scale, the 5-point rating was employed to avail the farmers the opportunity to describe their perception towards the effectiveness of Babban Gona services in the study area. The rating was in the order: highly effective (HE) =5, effective (E) =4, moderately effective (ME) =3, least effective (LE) =2, ineffective (I) =1.

The inferential statistic used was Tobit regression model to determine the factors influencing farmer's level of participation in Babban Gona farm services. The explicit Tobit model is expressed as:

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu \dots \dots \dots (2)$$

Where, Y^* = participation index, X_1 = age (years), X_2 = household size (number of persons), X_3 = level of education, X_4 = farm size (hectares), X_5 = sex (male = 1; female = 2), X_6 = marital status, X_7 = membership of cooperative (years), β_0 = constant, $\beta_1 - \beta_{10}$ = the coefficients for the respective variables in the Tobit function, μ = error term.

RESULTS AND DISCUSSION

SOCIO-ECONOMIC CHARACTERISTICS OF BABBAN GONA MAIZE FARMERS

The result in Table 2 indicated that most (92%) of participating farmers were male with fewer percentage accrued to female counterparts. This result is skewed towards male folk. The majority (86.2%) of the participants were married. Ezike *et al.* (2024) opined that the significance of marital status on agricultural production is associated with the supply of agricultural family labour. The study revealed that over 50% of farmers participate in formal education. This implies that these categories of farmers are well informed. The result showed that most (93.3%) of the participants maize farmers were within the productive age bracket 20-49 years. The mean age for the participants surveyed was 34. This shows that farmers are active, agile and can stand the demands for maize production. The larger proportion of participants (72.2%) had household size between 1-10 people with an average household size of 9. This large household size depicts common characteristics of rural households particularly in Northern Nigeria where polygamy is mostly practiced and family labour is also utilized for farming activities. majority of the participants with 79.3% have land holding of between 0.1 hectares – 2.0 hectares. The analysis further revealed that the mean farm sizes recorded during the survey for participants were 1.69. These farmers still fall within the range of smallholder farmers (Nwoko *et al.*, 2023). More than half, 68.7% of the farmers are members of farmers group or cooperatives with an average of three years spent as a member.

Table 2: Socio-economic Characteristics of Babban Gona Maize Farmers

Variable	Dominant Indicator	Mean
Age	93.3% of the respondents were aged between 20-49 years	34±6.5
Sex	Majority (92%) were male	
Marital status	Majority (86.2%) were married	na
Education level	92% of the respondents had one form of education or another with secondary education accounting for 40%	
Household size	72.2% have household size of 1-10 people	9
Farm size	79.3% have land holding of between 0.1 – 2 hectares	1.69±0.27
Cooperative membership	68.7% of the farmers are members of farmers group or cooperatives	3±0.15

Level of Participation of Farmers under the Babban Gona Farmer Services

The results in Table 3 highlight the distribution of participants by their level of participation in Babban Gona farmer services. Participants were categorized into four (4) groups namely; low, medium, high and very high, based on their level of involvement in services rendered by Babban Gona. In this study, a total of eleven (11) services were identified and they include; training on agronomical practices, access to credit, fertilizer supply, agrochemical application, seed supply, linkage to market, storage facilities, tractor services, transportation, threshing services and miscellaneous items (sacks, needles, and thread).

The participation index of sampled participants indicated that less than 1% of the respondents had participation index ranging from 0.1 to 0.25. This implies that less than 1% of participants participated in 3 or less services only, which indicates that only a few farmers are not participating in Babban Gona services. The finding also indicated that 5% had medium participation, 14.9% with high participation and over two-third of the respondents had very high participation. This invariably indicates that the level of farmers' participation in Babban Gona is desirable and very active since most of them received adequate information on the programme. The implication is that the programme is successfully implemented due to level of participation (96%) of the beneficiaries in the programme planning and implementation. Omotesho *et al.* (2016), and Okwuokenye and Onyemekihian (2024), in their study reveal appreciable level of participation in farmer group activities.

Table 3: Distribution of Participants by their Level of Participation in Babban Gona Farmer Services

Participants Category	Participation index	Frequency	Percentage	Mean participation	Std Dev
Low participation	0.1-0.25	3	0.8	0.1	1.7E-17
Medium participation	0.251-0.50	19	5.0	0.32	0.076472
High participation	0.51-0.75	56	14.9	0.70	0.060741
Very high participation	0.751-1.00	299	79.3	0.96	0.067574
Total	1	377	100		

Farmers' Perception towards Effectiveness of Babban Gona Farmer Services

Results in Table 4 indicated that threshing services ($\bar{x}$ =3.38), fertilizer supply ($\bar{x}$ =3.19), access to credit ($\bar{x}$ =3.17), transportation ($\bar{x}$ =3.13), storage facilities ($\bar{x}$ =3.12) and agrochemical application ($\bar{x}$ =3.01) were perceived to be moderately effective among the Babban Gona goals. A plausible explanation to this is that no single farmers disagreed with this assertion that Babban Gona farmer services provide productive resources to enhance their productivity and poverty status. The fulfilment of the project goal by the donor encourages the farmers to have positive attitude towards the project but according to the farmers most of these productive resources were provided to them lately into the season. This needs to be step-up by the donor agencies since the project goal is reduction of poverty through improving the livelihoods and living conditions of the rural poor by empowering and supporting them to effectively manage their own development activities.



Linkage to Market ($\bar{x}$ =2.85), Tractor Services ($\bar{x}$ =2.88) and Seed supply ($\bar{x}$ =2.89) were perceived to be least effective in improving participation in Babban Gona services. Market access proponents argue that for smallholders to thrive in a global economy there is the need to shift the focus from production-based programmes to that of marketing interventions. One of these marketing-based interventions is Babban Gona services whose approach begins with identifying a target market, followed by developing strategic partnerships with agribusiness firms that service this market and are committed to local production through backward integration. The farmers revealed that the project was unable to assist them by identifying a target market for maize varieties at competitive price but rather mopping up the produce from various farmers. The result conforms with the findings of Henning *et al.* (2022), who stated that lack of market access serves as barrier to effective participation in agricultural services.

However, the overall mean weighted score was 3.01, which implied that the farmers had positive perception of the effectiveness of the programme. This result is in alignment with the study of Maksi *et al.* (2025), where the respondents have a generally strong perception on interventions of agricultural development projects in Tanzania.

Table 4: Farmers' Perception towards the Effectiveness of the of Babban Gona Services

Perception	Mean	Std. Deviation	Decision
Threshing services	3.3793	1.36713	Moderately effective
Fertilizer supply	3.191	1.23582	Moderately effective
Access to credit	3.1777	1.23888	Moderately effective
Transportation	3.1326	1.22623	Moderately effective
Storage facilities	3.1247	1.29148	Moderately effective
Agrochemical application	3.0133	1.22359	Moderately effective
Seed supply	2.9416	1.20804	least effective
Training in Agronomical Practices	2.8992	1.44046	least effective
Tractor Services	2.878	1.20326	least effective
Linkage to Market	2.8541	1.41513	least effective

FACTORS INFLUENCING LEVEL OF FARMER'S PARTICIPATION IN BABBAN GONA SERVICES

The result of the estimated Tobit regression model in Table 5 shows that the DECOMP based fit measure is 0.5313. This indicates that 53% variation in level of participation in Babban Gona services maize farmers is explained by variations in the specified explanatory variables. The Likelihood ratio (LR) of 141.08 was significant at 1%, suggesting that the model has good explanatory power on the changes in Babban Gona services among the respondents with 99% level of confidence.

The results revealed that the estimated coefficient of household size was positive and significant ($P<0.01$) in influencing farmers' level of participation in Babban Gona services. This implies that with a larger family size which tends to translate into increased family labour supply, farmers tend to increase the probability level of participation in Babban Gona services to cater for family need. This finding is in line with Okwukenye and Onyemekihian (2024) who observed that household size was a positive factor that influenced attitudes towards participating in farmers' local organizations in South-south, Nigeria.

The estimated coefficient of level of education was positive and significant ($P<0.01$) in influencing the level of maize farmers participation in Babban Gona Services. This implies that education is a very important factor that influences farmers' level of participation. The positive and significant relationship level of education and level of participation in the study area agrees with the study of Murigi *et al.*, (2024) that farmers with high level of education are more likely to participate in contract farming in Kenya.

Table 5: Factors Influencing Level of Farmer's Participation in Babban Gona Services

Variables	Coefficient	Standard error	b/St.Er.
Constant	0.509***	0.051	9.836
Sex	0.049	0.032	1.533
Age	0.001	0.0008	1.409
Marital status	-0.008	0.009	-0.956
Household size	0.008***	0.001	7.662
Education	0.022**	0.006	3.343
Farm size	0.019*	0.010	1.917
Cooperative membership	0.029***	0.004	6.104
Sigma	0.1612***	.0058	27.459
Diagnostic Variables			
Observations	377		
LR chi ²	141.08		
Prob> chi ²	0.000		
Log likelihood	153.01		
Info. Criterion: AIC	-0.764		-
Decomp based fit measure	0.5315		

*** significant at 1%, ** significant at 5%, * significant at 10%.

Membership of a cooperative group had a positive influence on level of participation and was statistically significant at ($P < 0.01$), suggesting that membership of a cooperative society will increase the probability of a farmers' participation. Membership of cooperatives societies has propensity to provision of credit facilities. Suffice it to note that cooperative societies are supposed to be a driving engine for development in the rural area, but where such society is inactive, members may be deprived of most benefit attached to it. This result is in line with the findings of Hoang and Nguyen (2023) that cooperative membership positively and significantly influence participation in contract farming in Vietnam.

CONCLUSION AND RECOMMENDATIONS

Based on the findings it can be concluded that household size, education, farm size and membership of cooperatives were the determinants of maize farmers participation in Babban Gona Services in the study area. Also, farmers have a positive perception towards the effectiveness of the services rendered. Female participation is still very low. This is a major setback considering the role of women as major drivers of small and medium scale agricultural production even with limited access to land, input and services. The study recommended that

- Concerted effort should be made to extend the services of the Babban Gona to female folks by collaborating with NGOs and development agencies.
- The need to enhance capacity by employing experienced field agents that have the ability to transfer knowledge in a form that can be easily adopted by the farmers and also set up a system that can link reward to performance as a means of motivating these agents to perform optimally.

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