



# **Determinants of Women's Participation in Agricultural Activities in Lafia Metropolis, Nigeria**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The study analysed the determinants of women's participation in agriculture in Nasarawa State, Nigeria; with a particular emphasis on how socio-economic factors determine women's participation and agricultural productivity. To this end, a study was conducted in Lafia metropolis with a random sample of 210 women to examine the status of women's participation in agriculture. Data analysed was collected by administering a structured questionnaire to women in the study area. Descriptive statistics and a logit regression model were employed to analyse the data. The findings from the analysis revealed that the main determinants of women's participation in agriculture are the size of the farmland and women's cooperative participation. On the other hand, Age, level of education, accessibility to credit, and household size were insignificant in determining women's participation in agriculture in Lafia Metropolis. The study recommended that Government should as a matter of urgency formulate favourable policies that would increase women access to farmland, eliminate poor land tenure system, encourage women participation in cooperative groups

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and small farm forums and encourage girlchild and women education necessary to increase women knowledge and empowerment which would inturn increase agricultural participation and productivity.

*Keywords: Agriculture; participation; women; Nasarawa State, Nigeria.*

## 1. INTRODUCTION

Over the years several studies have highlighted the fundamental role of agriculture in lifting rural people out of poverty and enhancing food security globally [1,2,3]. Agriculture is the vertical backbone of most developing countries, with a major part of the population earning its livelihood from various agricultural activities [4]. For instance, the Nigerian economy is still predominantly agrarian and women are key players in the agricultural sector, most notably within rural communities [5,6]. Although Nigeria has one of the lowest recorded female labour force participation rates which is way below that of their foreign counterparts, women still contribute between 40 and 65% of all hours spent in agricultural production in Nigeria and other sub-Saharan Africa, thus providing more than two-thirds of the workforce in the agricultural sector [7-9], Food and Agriculture Organization of the United Nations (FAO [10]). However, women still face formidable limitations in contributing their quota to the development of the agricultural sector [11,12].

Despite the obstacles faced by most female farmers in Africa, women have taken a critical role in agricultural production in Nigeria, ranging from crop and livestock production to food processing, storage, and marketing. But to a large extent, the determinants of their participation in agriculture connect to the roles of various actors or stakeholders [13,14]. However, a steady increase in population growth has been identified as a key fuelling factor stimulating the demand for a timely supply of food and raw materials for production which could only be satisfied through agricultural production [15]. This increasing human population and high demand for food, has also fuelled women's participation in agriculture.

The greatest challenge to the Nigerian agricultural sector is increasing agricultural production and the value of agricultural products. Such an increase will have to be based on intensification and on adding value to products. Women are at the forefront of meeting this challenge, as agricultural production is primarily

their domain. For women, the long-term benefits of agricultural growth which influences their participation in agriculture are unclear. As women are the backbone of the agricultural sector, contributing significantly to agricultural production, it is important to try to identify what the determinants of women participation in agriculture are likely to be [16,17, 11].

The North-central path of Nigeria has been leading the call for increasing agricultural production, especially in food and cash groups. As of 2021, the north central produces about 30 percent of the food crops in Nigeria [18,19]. Interestingly, women's participation has been on the increase over the years, although this can not be said for all regions. Nasarawa state which is the second largest producer of root crops is leading the trail in the participation of agricultural activities [20]. The government of the state has employed programs such as Nasarawa State Agricultural Development Programme (NSADP) [21] aimed at encouraging women's participation in agricultural activities. Despite this loadable effort, the factors that influence women's participation and the extent to which women's participation affected agricultural productivity in the state are scarcely discussed in the literature. This discussion is vital because according to the FAO [10], food security can only be guaranteed if women are allowed to own land and participate fully in agricultural activities.

Identifying the factors capable of increasing women's participation in agriculture is a step in the right direction necessary for policy formulation. To formulate agricultural policies, policymakers need to first understand the determinants of women's participation in agriculture, identify women's perception, adoption, and accessibility to modern agricultural techniques for increased agricultural productivity. Despite the existence of agricultural interventions and policies by the Nigerian government and other private organizations in Nigeria, women's participation in agriculture is still very low. Given this, there is a need to examine the factors influencing female farmers' willingness to participate in agriculture. Therefore, the specific objectives of this study are: to examine the

determinants of women's participation in agricultural activities as experienced in Lafia Metropolis; identify the level of awareness and accessibility of female farmers to productive resources in Lafia metropolis. Determine how satisfied women are with their participation in agricultural production in Lafia Metropolis. And identify the factors that determine the level of women's satisfaction in agriculture in Lafia Metropolis.

## **2. LITERATURE REVIEW**

Many studies have analysed the determinants of women's participation in agriculture and the effect on agricultural production, the constraints faced by women's participation in agriculture, and examined the resource domain of empowerment. However, scanty literature exists on the determinants of women's participation in agriculture in Lafia Metropolis. Some notable studies that drew the attention of researchers to the determinants and effect of women's participation in agriculture on productivity include the works of Baurau and Oladeji [8], Sireeranhan [22], Adebisi and Monisola [5], Asogwa, Dongo, Ndubuaka & Hammed [14]. The findings from these studies revealed that food security, income supplement, and accessibility to land are the motivating factors for women's involvement in agriculture. Also, Sireeranhan [22], Olawepo, and Fatulu (2012), Tadesse, Melese, & Tamene [17], Yu & Osabohien [23] and Ghash and Ghosh [24] revealed that women's level of education, years of experience, extension services, cooperative bodies women belong to and their level of contribution in such cooperatives had a positive significant relationship and allocation of inputs for household farm production positively affect the efficiency of agricultural productivity of women.

Literature on the resource domain of empowerment reveals that increasing women's control over productive resources has significant effects on women's development indicators such as their share of household budgetary expenditure [25,26], child nutritional outcomes [27] and productivity [28], among others. A woman's access to these productive resources will improve her decision-making within the household, enhance her freedom of mobility and develop her views and voice. These will, in turn, improve interest in participating in agriculture and the overall output of the household [27,4,9]. Also, literature on women empowerment, in terms of the effect of educational achievement, training, access to knowledge, and information on the use

of improved techniques on women's agricultural productivity revealed that education, training on the use of modern technology, women's access and adoption of new technology has a positive effect on women agricultural productivity and as well enhances their participation in agriculture [29,30,31,32].

Identifying the major determinants of women's participation in agriculture has received attention in recent times. However, studies that have analysed the determinant of women's participation in agriculture [10, 1, 33, 34] found that the major determinants of women's participation in agriculture include access to productive resources, women's share of farm income, cooperative participation, contact with agricultural extension services, age, educational level, farm size and level of experience.

Studies by Farayola<sup>1</sup>, Adedeji, Popoola, and Amao [35], Joshua & Omahas, [6], Ola, [3] and Ogunlele and Mukhtar [36] noted that time spent in agricultural activities, awareness, access and increased adoption of new technology by women are strong determinants of women's participation in agriculture. However, the effect of these determinants may be positive or negative on women's participation in agriculture and productivity. For instance, women's participation in cooperative activities may increase women's income but at the same time, reduces the time allocated to engaging in agricultural activities. This may, in turn, lead to poor agricultural output and national output. The findings from the literature thus reveal that the various determinants of women's empowerment have both positive and negative effects on women's participation in agriculture and agricultural output.

## **3. METHODOLOGY**

### **3.1 Study Area**

We carried out a survey in Lafia Metropolis in Nasarawa State located in the North central region of Nigeria. The study used mainly primary data, the relevant primary data were obtained through a survey of farm households. According to the National Bureau of Statistics [37], the estimated population of the target area is about 1,869,377 where 50 percent of the population are farmers, 30 percent are civil servants and the other 20 percent are artisans and other related trade. Of the total population in the area, the NBS [38] statistics show that about 56 percent are women. The study employed the Yamane

[39] sample size determination using the Yamane Sample size determination the estimated sample for the study is calculated thus:

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

where n is the sample size; N is the population size and e is the level of precision or sample of error which in this study is plus or minus 5 percent. The estimated sample size based on the formula is about 210 Structured questionnaires administered to women were the main instrument used to obtain data for the empirical analysis. Seven wards were first randomly selected from the 13 wards that make up Lafia Local Government Areas (LGAs). Secondly, out of these seven wards, there was a random selection of sample farm households from the selected wards. In each of the seven selected wards, 30 farm Households were randomly selected giving a total of 210 sample households. Of the 210 questionnaires issued, 209 questionnaires were successfully returned and verified for analysis.

### 3.2 Materials and Methods

The details of the survey data included information on the household and demographic characteristics of the respondents such as the size of household farms, household size, age, and educational status; and farm characteristics which include the farm size, use of improved seedlings, contact with extension agents, accessibility to credit, years of farming experience, cooperative participation, involvement in farm-decisions, the accessibility of productive resources and respondents level of satisfaction participating in agriculture. Analysis of the data was done using descriptive statistics such as mean, frequency, and percentage.

This study further employed a logit regression model to estimate the relationship between the variables of interest. The logit regression model is a multivariate or unit technique that allows for the estimation of the probability that an event may or may not occurs by predicting a binary dependent outcome from a set of independent variables [35]. This method was used to determine the factors affecting farmers' participation in agriculture in Lafia metropolis. The two main reasons for choosing the Logit model in this study instead of linear probability models according to [11], is that the Logit model ensures the production of the probability of choice within the (0, 1) range. This is an

advantage over the linear probability model and the ease and convenience associated with the computation of the logit model. The logit model is based on a cumulative logistic probability function and it is computationally tractable. According to Gujarati and Porter [40], the logit model is expressed as:

$$p_i = E\left(Y = \frac{1}{X_i}\right) = B_1 + B_2X_2 + B_3X_i \quad (1)$$

In its simple form, equation (1) can be expressed as

$$p_i = \frac{1}{1+e^{-zi}} = \frac{e^z}{1+e^z} \quad (2)$$

Where pi is the probability that the event will occur, therefore the explicit model of the logistic regression for this study is expressed as:

$$Y_i = B_0 + X_iB_i + V_i \quad (3)$$

Where  $X_i$  represents independent variables and  $Y_i$  is a dichotomous response variable that denotes women's participation in agriculture proxied by the level of women's satisfaction with participating in agriculture ( $Y= 1$  if respondent  $i$  satisfaction is high;  $0$  if satisfaction is low)

$X_1$ = Farm Size (acres)

$X_2$  = Cooperative participation (1 if a member of a cooperative; 0 if otherwise)

$X_3$  = Age (years)

$X_4$  = Educational Status (1= no formal education, 2 = primary, 3 = secondary, 4 = tertiary)

$X_7$  = Accessibility to Credit (Amount of loan farmer accessed)

$X_6$  = Household Size

$b_0$  = constant term

$u$  = error term

## 4. RESULTS AND DISCUSSION

### Socio-economic characteristics of respondents and descriptive statistics of variable:

The socio-economic characteristics distributions of respondents summarized in Table 1 showed that the mean age of respondents was 6.43. This indicated that the majority of the respondents fall within the age range of 35 and 44 years and the highest percentage 19.14 % of the respondents fell within the age range of 40 to 44 years as shown in Table 2. The results of this study revealed that most of the respondents were still within the middle and active age group. The majority of the respondents (69.86 %) were married whereas 11.48 % were single, 8.13 %

were divorced and 10.53% were widows. This finding implies that married women dominate various farming activities in the study area. This observation can be attributed to the fact that married women may have more access to agricultural resources such as land, credit, and improved input and are considered to be dependent because of their marital status. The report of this finding is supported by Tijani & Tijani [7] and Yu & Osabohien [23] who reported that married women are more engaged in agricultural productivity than single due to the great responsibilities faced by married women in their households. Which includes providing food, generating income, and providing other basic household needs. Thus, engaging in agriculture is a necessary path to generating food and income needed by women to sustain their households.

In Table 1 it was also observed that the mean of the educational status of the respondents was 3.51 and Table 2 showed that the highest number (148) of women had attained a tertiary level of education. While the least number (15) of women farmers in the study area had no formal education. The findings revealed that only a few women farmers in the study area had no formal education. The educational status of farmers is a vital factor because, it could be used to determine farmers' level of adoption of new agricultural innovations and techniques of farming without difficulties which is capable of increasing their agricultural output [41].

The results from Table 2 showed that crop farming (89.48 %) was the major type of farming practiced by the respondents, followed by animal husbandry (9.09 %). This means that the majority of the female farmers in the study cultivated various types of crops to produce food and generating income. Results of the farm size cultivated by respondents in Table 1 showed a mean value of 1.69 for farm size. This implies that the majority of the respondents cultivated less than 2 acres of farmland for agricultural production. This agrees with the findings of Yohanna, Ishaq, and Muhammad [15] which suggested that most female farmers are faced with the difficulty of acquiring land for farming purposes and most farmers in Nigeria produce generally on small scale.

The data on years of farming experience revealed a mean value of 11.66, this shows that the average years of farming experience of the respondents was 11 years, with the respondents

with the highest years of farming experience of 37 years while the farmer with the least years of farming experience is 2 years. The result shows that most of the women farmers in the study area have reasonable years of farming experience. According to Ufondu, Maziya-Dixon, Okonkwo and Okoyeuzu [42] The higher the number of years of farming experience, the more the farmer becomes aware of new production techniques, socio-economic policies and factors affecting agriculture and the higher the agricultural output obtained.

Considering the rate of use of improved seedlings by female farmers in the study area, Table 2 shows a high rate of use of improved seedlings of about 97.61% (204). This implies a high rate of adoption and employment of new methods and techniques of agriculture by female farmers in Lafia metropolis. This is an indication that female farmers are aware of the role of improved seedlings in boosting their agricultural output and productivity [43-47]. Table 2 further revealed that about 136 (65.07%) of the respondents are members of various cooperative groups. Indicating a high rate of cooperative participation among female farmers in the study area.

The study observed generally very low accessibility to loans and credit by farmers in the study area. Only about 9.51% (20 respondents) had accessed loans for agricultural purposes. The other 189 (90.49%) respondents had never accessed credit for agricultural production (Table 2). Women's lack of access to credit facilities limits the scale of their farm production and willingness to adopt new farming practices, and buy new equipment and other agricultural inputs [11]. To examine the extent these factors affect women's participation in Lafia Metropolis, we estimate the logit regression equation in Table 3.

Logit maximum likelihood estimates for the factors determining women's participation in agriculture in Lafia metropolis, Nasarawa State.

Table 3 depicts the result of the logit regression of factors affecting Women's participation in agricultural activities in the Lafia metropolis. The result indicates that Age, education, accessibility to credit, and Household size were found to be insignificant in influencing women's participation in agriculture in Lafia metropolis. The coefficient of Farm size of the farmer which was found to be positive and significant at 10% implies that the

**Table 1. Descriptive statistics of variables**

Variables	Age	Marital Status	Household Size	Farming Experience	Education Status	Farm Size	Access to credit	Improved Seedlings	Level of Satisfaction
No of observations	209	209	209	209	209	209	209	209	209
Mean	6.43	1.59	6.15	11.66	3.51	1.69	0.095	0.98	0.88
Standard deviation	1.86	1.02	2.497	7.92	0.89	1.40	0.029	0.15	0.33
Maximum	9	4	18	37	4	10	1	1	1
Minimum	2	1	2	2	1	1	0	0	0

Source: Computed from field survey data (2022).

**Table 2. Socio-economic characteristics of respondents**

Variables	Description	Frequency	Percentage
<b>Age (years)</b>	Less than 14	0	0
	15-19	3	1.44
	20-24	6	2.87
	25-29	34	16.27
	30-34	25	11.96
	35-39	33	15.79
	40-44	40	19.14
	45-49	31	14.83
	50 and above	37	17.70
<b>Marital Status</b>	Married	146	69.86
	Single	24	11.48
	Divorced	17	8.13
	Widow	22	10.53
<b>Education</b>	No Education	15	7.18
	Primary	12	5.74
	Secondary	34	16.27
	Tertiary	148	70.81
<b>Farming Type</b>	Crop Farming	186	89.48
	Animal Farming	12	9.09
	Fish Farming	3	1.44
<b>Use of improved seedlings</b>	Yes (1)	204	97.61
	No (0)	5	2.39

Variables	Description	Frequency	Percentage
<b>Membership of cooperative</b>	Yes (1)	136	65.07
	No (0)	73	34.93
<b>Access to credit (Loans)</b>	Yes (1)	20	9.51
	No (0)	189	90.43

Source: Computed from field survey (2022).

**Table 3. Logit Regression of Factors Affecting Women's Participation in Agriculture**

Variables	Coefficients	Z-statistics
Farm Size (X1)	0.6636(0.4007)**	1.66
Cooperative participation (X2)	1.3126(0.4655)*	2.85
Age (X3)	0.0590(0.1306)	0.45
Education (X4)	0.2198(0.2055)	1.07
Accessibility to credit(X5)	-0.2473(1.1315)	-0.22
Household size (X6)	0.0043(0.1011)	0.04
Constant (b <sub>0</sub> )	-0.4979(1.0617)	-0.47
-2 log likelihood	68.44	

Note: \*P < 0.05 \*\*p < 0.10 Significant level.

Values in parentheses = Standard errors

Source: Computed from field survey data (2022).

**Table 4. Level of women's satisfaction with participating in agriculture in Lafia Metropolis**

Level of Satisfaction	Percentage (%)	Frequency
Low	11.96	25
High	88.4	186
Total	100	209

Source: Computed from field survey (2022).

higher the farm size of the farmers, the higher their participation in agricultural activities. This could largely be attributed to women's accessibility to farm productive resources. The more women have access to productive resources such as land the more they are stimulated to venture into large-scale agricultural production as such increasing the participation rate in agriculture.

The result of this study is consistent with the result of a similar study by Rahman [11] on Women's involvement in agriculture in northern and southern Kaduna State, the study revealed that improved women's access to productive resources such as land, credit, and appropriate technologies could enhance their food production and processing. The coefficient of cooperative participation by the female farmers was found to be positive and significant at 5% implying that the higher the cooperative participation by farmers, the higher their participation in agricultural activities; which was evident in the response of most farmers that it is easier for them to access loans, moral support, counsel and other facilities from this cooperatives than from banks and other government agencies needed to increase their agricultural production.

**Women's responsiveness and satisfaction from participating in agriculture in Lafia metropolis:** Women's orientations and understanding of the benefits accrued to participating in agriculture can improve their satisfaction and trigger agricultural development of the country. Hence, it is therefore imperative to identify the key factors that determine women's satisfaction in participating in agriculture. Table 4 shows the result of the level of satisfaction of respondents. To understand the degree of each determinant factor on women's satisfaction, an estimation of the level of satisfaction of the respondents is important.

In Table 4 the level of women's satisfaction in agriculture in lafia metropolis is identified to be high. The result revealed that 88.4 % of the respondents are highly satisfied with participating in agriculture, while 11.96% of the respondent

derive low satisfaction from participating in agriculture.

## 5. CONCLUSION AND RECOMMENDATION

The findings of this study showed that despite the constraint faced by female farmers in the study area, the majority of the respondents (88%) are satisfied with participating in agriculture in lafia metropolis. Similarly, the result of the logit regression analysis showed that women's participation in cooperative groups and farm size are the major determinants of women's participation in agricultural activities in the study area. Women gain financial, material, and moral assistance from participating in cooperative groups highly needed to expand their agricultural production, because credits and loans from these cooperatives are easily accessible to members. Also, the size of the farmland increases the wpmen's agricultural productivity in the study area, the higher the land cultivated the higher the agricultural output. Hence, the study recommends the following:

1. Government and Non-government agencies should as a matter of urgency increase female farmers' accessibility to farm land and other productive resources, such credit, modern machinaries and new technologies for farming in other to enhance women participation in agriculture in Nigeria. This can be achieved through the formulation of favourable agricultural policies that would eliminate poor land tenure system and other discriminations against women owning and acquiring lands for agricultural purposes most especially in the rural part of the country.
2. The government and Non-government organisations should also develop and devise ways to encourage women's participation in cooperatives groups, small farm groups and other small informal educative forums. These channels can increase women's accessibility to productive resources, credits, ideas, and innovations necessary to increase their



agricultural productivity and participation in agriculture.

3. Government should as a matter of urgency, increase investment in education, by developing literacy programs and training for females farmers most notably in the rural areas of the country needed to increase women knowledge and access to modern techniques of farming and empowernmet them to posses more lands and productive resources for agricultural production. This is capable of enhancing women agricultural participation and productivity. Similarly, investment in girl child education should be prioritised by the government in other to increase female literacy rate and women empowerment in agriculture.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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