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ORIGINAL ARTICLE

Drivers and barriers of women participation in agricultural activities in Nigeria

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Abstract - The study examined the drivers of women participation in agricultural activities in Nigeria. A total of 636 women farmers were used for the study and data were collected through interview and questionnaire process. Descriptive statistics, Participation index and Ordered Logit regression were used to analyze the data. The results revealed that the mean age, household size, farming experience and farm size were 44 years, 8 members, 18 years and 3.1 ha respectively. The result also revealed that women farmers in Nigeria engaged themselves in agricultural activities such as crop farming, livestock farming, agricultural trading, poultry farming, horticultural farming and aquaculture farming. Result of the participation index revealed that women farmers were actively involved in agriculture with 49.06 % of the women with high level of participation. The regression analysis revealed that the positive drivers of women participation in agricultural activities were household size, marital status, level of education, farming experience, disposable income, extension service and membership of association. In the contrary, distance to farm is a negative driver of women participation in agricultural activities in the study area. In addition, inadequate financial opportunities and inadequate access to extension services were among the serious constraints that hindered women participation in agricultural activities.

Keywords: Drivers of participation. Ordered Logit regression. Women farmers.

Impulsionadores e barreiras da participação das mulheres nas atividades agrícolas na Nigéria

Resumo - O estudo examinou os impulsionadores da participação das mulheres nas atividades agrícolas na Nigéria. Um total de 636 mulheres agricultoras foram utilizadas para o estudo e os dados foram coletados por meio de entrevista e questionário. Estatística descritiva, índice de participação e regressão Logit Ordenado foram utilizados para analisar os dados. Os resultados revelaram que a média de idade, tamanho do agregado familiar, experiência agrícola e tamanho da propriedade foram de 44 anos, 8 membros, 18 anos e 3,1 ha, respectivamente. O resultado também revelou que as mulheres agricultoras na Nigéria se engajaram em atividades agrícolas, como agricultura, pecuária, comércio agrícola, avicultura, horticultura e aquicultura. O resultado do índice de participação revelou que as agricultoras estavam ativamente envolvidas na agricultura com 49,06 % das mulheres com alto nível de participação. A análise de regressão revelou que os impulsionadores positivos da participação das mulheres nas atividades agrícolas foram o tamanho do agregado familiar, estado civil, nível de educação, experiência agrícola, rendimento disponível, serviço de extensão e associação a associações. Ao contrário, a distância da fazenda é um fator negativo da participação das mulheres nas atividades agrícolas na área de estudo. Além disso, oportunidades financeiras inadequadas e acesso inadequado a serviços de extensão estavam entre as sérias restrições que dificultavam a participação das mulheres nas atividades agrícolas.

Palavras-chave: Impulsionadores da participação. Regressão Logit ordenada. Mulheres agricultoras.

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Introduction

Agriculture has been recognized as one of the tools for growth and poverty reduction in countries where it is the main occupation of the larger proportion of the people. Nigeria's Gross Domestic Product (GDP) was estimated to be ₦ 72.39 trillion (Nigerian currency – NGN) as at 2021 which has grown by 3.4 % at a fast rate in 7 years. In terms of sectorial contributions to the GDP, agricultural sector's contribution dropped from 26.21 % as recorded in 2020 to 25.88 % in 2021. The service, industrial and oil sectors accounted for 53.56 %, 20.56 % and 7.24 % respectively (NBS, 2022).

The role of agriculture has been re-appraised and re-valued on its contribution to industrialization and its importance for harmonious development, political, and economic stability with emphasis on women participation in agricultural activities. Moreso, agricultural resources have become increasingly responsive to market forces and increasingly integrated in the network of industrial interdependencies mainly shaped by technological advancement, vertical integration, marketing and consumer preferences (FAO, 2011). The Human Development Index (HDI) for Nigeria was estimated to be 0.539 as at 2019 with command over economic resources to be 4,107 for female and 5,692 for male (HUMAN DEVELOPMENT REPORT, 2020).

The activities of women in agriculture cannot be over-emphasized. In many countries across the globe, the contribution of women in ensuring that food is readily available for the teeming population across the globe is so commendable. Women are found working all the year round producing food crops (BANJI; OKUNADE, 2011). The nature and extent to which women involve in agriculture varies from region to region. But regardless of this variation, women are actively involved in agricultural activities. Over the decade's agriculture has proven to be a critical source of livelihood for women in many developing countries and a key pathway out of poverty. On an average, women comprise 43 % of the agricultural labour force in developing countries, ranging from 20 % in Latin America to 50 % in Eastern Asia and Sub-Saharan Africa. The Food and Agriculture Organization (FAO) (2013) estimates shows that women represents a substantial share of the total agricultural labour force, as individual food producers or as agricultural workers, and that around two thirds of the female labour force in developing countries are engaged in agricultural work (UZOKWE; OFUOKU; DAFE, 2017).

Women involvement in agricultural production therefore cut across various subsectors such as planting, weeding, harvesting, processing and marketing as well as rearing livestock (SOUBH, 2006). Women are knowledgeable on the medicinal use of plants; have been in the forefront of soil conservation programmes and perform most of the household labour devoted to animals (COMMON WEALTH, 2016). This necessitates their integration into planning, policies, and programmes for effective and sustainable development of a nation (FAO, 2003). Women grows substantial amount of food consumed, yet their access to knowledge, technology, credits and land are limited compared to men (JIRIKO, 2015). Women contribute tremendously to agricultural output but unfortunately, they hardly benefit from agricultural incentives and innovation due to economic suppression, social and traditional practices which undermine the constitutional provision on equality of men and women (OGUNLELA; MUKHTAR, 2009). Therefore, the productivity and economic empowerment of women should be a logical priority of agriculture programs and policies that will seek to promote and encourage participation of women. There are many reasons as to why women engage in agricultural activities, some of which are; desire





to earn income, personal interest, lack of handy alternative occupation, husband influence, temporary and/or permanent migration of husbands. Women as farmers face a lot of obstacles than men in gaining access to resources for production as well as barriers of customs and beliefs that confine women to the domestic sphere which in many ways hinders their participation effectively in agricultural activities (FAO, 2011).

According to FAO (2011), there is a significant global gender gap in agriculture, which translates into a costly lost opportunity to improve the quality and quantity of the world's food supply. If women had the same access to, and control over productive resources as men, they could increase yields on their farms by 20 to 30 %. Women's access to and control over land can potentially lead to gender equality alongside addressing material deprivation (QUISUMBING *et al.*, 2014). The exclusion of women from access to and control over assets, whether land, technology or credit potentially lowers growth (EVERS; WALTERS, 2000). Women as farmers, workers, and entrepreneurs face more challenges than men in accessing productive resources, markets and services referred to as "gender gap" which impede their effective participation in agricultural and political activities thereby reducing their contributions to the attainment of broader societal goals (FAO, 2011). Lending credence to this, FAO (2020) pointed out that persisting inequalities between women and men are a major obstacle to agriculture and rural development and that eliminating these disparities is essential to building sustainable and inclusive food systems and resilient and peaceful societies.

There are empirical evidences Beach (2013) and Iwena (2015) that increased equality in access to economic assets has shown a significant raise in the productivity of female producers. This in turn helps improve household welfare through better bargaining power. These studies concluded that increasing women's control over economic assets have strong and immediate effects on the welfare of the next generation and on the level and pace at which physical and human capital are accumulated. Education has been widely expressed as an instrument for social, economic, and political change. A country will continue to witness underdevelopment without human resources that are educated. Osuji (2015) noted that women are light in most homes, especially when they are empowered through education. Farmers' education and training at all levels will enable the women to access loan, embrace new technologies that would boost agricultural production, stand on their right to access land for production, form and manage cooperative society and oppose most traditions that pose problem to food production by women.

Despite several intervention programmes introduced such as Women in Agriculture through the Agricultural Development Programmes (ADP) to encourage women farmers participation and improve their standard of living, women farmers in the country still face some challenges such as lack of access to land, financial assistance, inconsistency markets for their produce, bad road network for easy transportation of farm produce, lack of access to fertilizer and chemicals. Thus there is need to examine the drivers of women participation in agricultural activities in Nigeria for policy interventions. The specific objectives of the study were to describe the socio-economic and institutional characteristics of women farmers, identify the various agricultural activities in which women are involved in, ascertain the level of participation of women in agricultural activities, determine the drivers of women participation in agricultural activities, and identify the constraints to women participation in agricultural activities in the study area.





This study will provide evidence that women play an important role through their participation in agricultural activities and if proper policy interventions are put in place agriculture sector could be revived with little efforts as compared to previous ones through contribution of women in agriculture. Following the recent closure of the Nigerian borders to the importation of certain products which are of eminent importance to the country, there has been a need to intensify the rate of production of agricultural products. If women are effectively recognized and aided in agricultural practices they might contribute better in agricultural production to augment the lapses of food shortage, hence this research seek to provide evidence that women play vital roles in improving agricultural sector and engage in various activities which will increase agricultural production. The study will determine the drivers of women participation in agricultural activities and evaluates the constraints that may or have hindered their participation. The findings of this study will also be useful to researchers in their quest to extend the frontier of knowledge and could serve as a blue print for policy makers on agriculture in their bid to introduce reforms or transformation in our agricultural development process.

Material and methods

The study was carried out in Nigeria. Nigeria is located on the western coast of Africa lies between Longitudes 3° and 14° and Latitudes 4° and 14°. It has a land mass of 923,768 square km. It is bordered to the north by the Republics of Niger and Chad; it shares borders to the west with the Republic of Benin, while the Republic of Cameroun shares the eastern borders right down to the shores of the Atlantic Ocean which forms the southern limits of Nigerian Territory. The 800km of coastline confers on the country the potentials of a maritime power. Land is in abundance in Nigeria for agricultural, industrial and commercial activities. Going by the population growth rate of 2.5 % (WORLD BANK, 2020), Nigeria has an estimated population of 212, 487, 030 as at October 1st 2021. The Federal Capital Territory is Abuja, which was created by decree in 1976 (NHC, 2021).

Nigeria has a diverse climates ranging from equatorial in South, tropical in central and arid in North. In general, the length of the rainy season decreases from south to north. In the south the rainy season lasts from March to November, whereas in the far north it lasts only from mid-May to September. A marked interruption in the rains occurs during August in the south, resulting in a short dry season often referred to as the “August break.” Precipitation is heavier in the south, especially in the southeast, which receives more than 120 inches (3,000 mm) of rain a year, compared with about 70 inches (1,800 mm) in the southwest. Rainfall decreases progressively away from the coast; the far north receives no more than 20 inches (500 mm) a year. Temperature and humidity remain relatively constant throughout the year in the south, while the seasons vary considerably in the north; during the northern dry season the daily temperature range becomes great as well. On the coast the mean monthly maximum temperatures are steady throughout the year. In general, mean maximum temperatures are higher in the north the humidity generally is high in the north, but it falls during the *harmattan* (the hot, dry northeast trade wind), which blows for more than three months in the north but rarely for more than two weeks along the coast (WORLD BANK, 2020).





Sampling Procedure and Sample Size

A multi-sampling procedure was employed in the collection of data for the study. As presented in Table 1, the first stage involved random selection of four (4) States (Kwara, Kogi, Ondo and Kaduna) in Nigeria.

Table 1. Sampling procedure.

State	Local government area	Communities	Sample size		
Kwara	Oyun	Ijagbo	15		
		Ipee	14		
		Ojoku	19		
		Igbonna	24		
	Offa	Meselu	19		
		Offa	22		
		Kanmonu	18		
		Igbodun	29		
Kogi	Kabba	Egbeda	19		
		Egunse	16		
		Okedayo	25		
		Aiyedun	17		
	Bunu	Agbede	21		
		Eshin	13		
		Aberin	15		
		Igba	10		
Ondo	Akoko North West	Gedegede	20		
		Ikaram	32		
		Iyani	28		
		Ibaram	18		
	Akoko North East	Ikare	13		
		Akunu	12		
		Ekakumo	20		
		Aoga	27		
		Kaduna	Jema'a	Anguwan Kagoma	16
				Gidan Waya	22
Anguwan Jagindi	22				
Anguwan Mada	24				
Sanga	Ankwa Sabin Gari Arak		25		
	Wasa		16		
		Nandu	26		
		Numbu Kwana	19		
		Total 4	8	32	636

Source: SADP, 2021.

In the second stage, two local government areas were randomly selected from the selected States, giving a total of eight (8) Local Government Areas. The third stage involved random selection of four (4) communities each from the eight (8) Local Government Areas, giving a total of thirty two (32) communities. In the fourth stage, sampling of women farmers were done proportionately to the total number of women farmers in each state using Yamane formula in equation (Equation 1), therefore making a sample size of 636 women farmers for the study. The participant was recruited to join the study through the help of the agricultural extension agents in each of the selected areas, who also assisted in providing the list of the women farmers for random selection.





$$\text{The Yamane formula is given as } n = \frac{N}{1+N(e)^2} \quad (\text{Equation 1})$$

Where:

n = sample size

N = finite population

e = limit of tolerable error at 10 % probability level.

1 = unity.

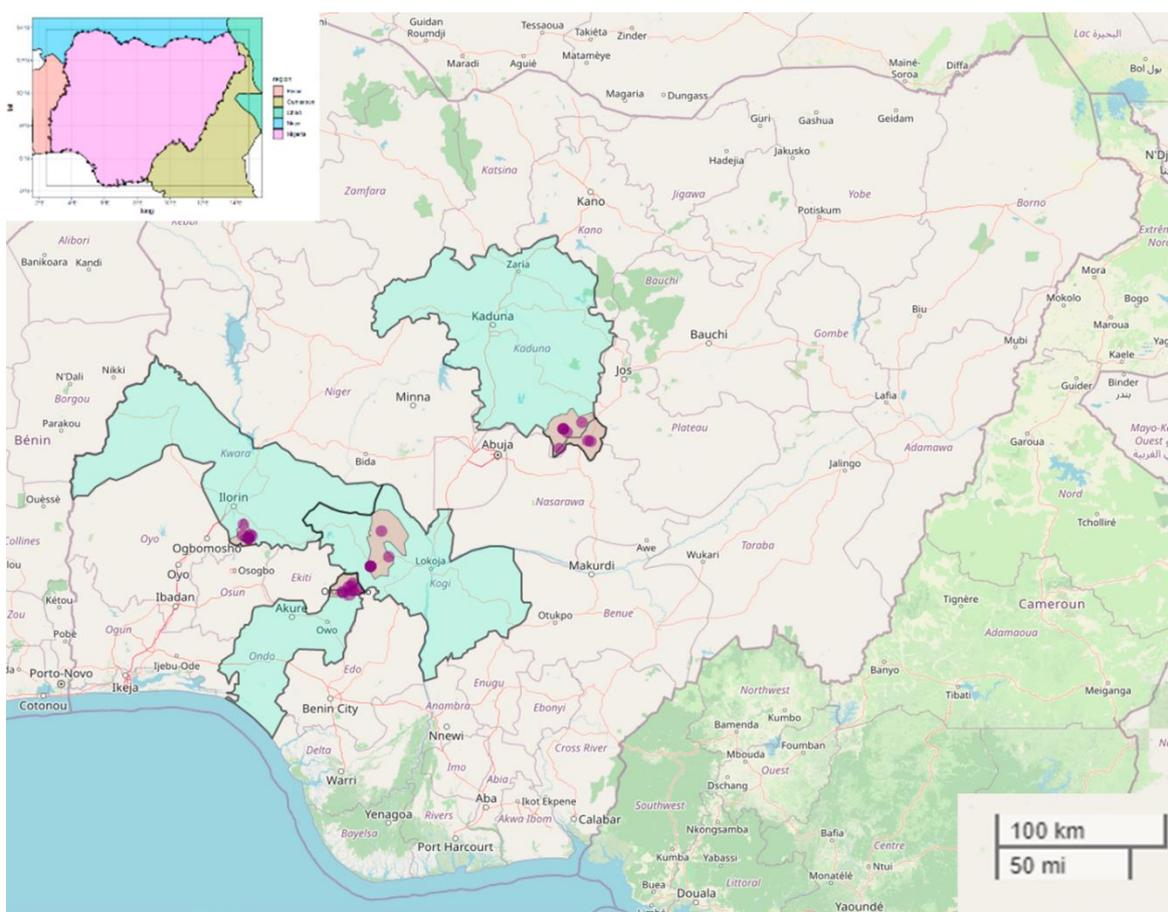


Figure 1. Map of Nigeria showing the sampled areas. Source: Cheng, Karambelkar and Xie (2018).

Method of Data Collection

Data were obtained through the use of questionnaire administered to 636 women farmers. Information that was collected includes socio-economic and institutional characteristics of the women farmers, various agricultural activities women are involved in, their participation level and constraints faced by women farmers. Studies involving human subjects, including questionnaire studies, do not need the approval of the Ethics Committee at any university in Nigeria, but are subject to the respondents' willingness to voluntarily provide what is asked of them and the researchers' assurance of confidentiality and use of the data collected solely for research purposes.



Analytical Techniques

On the data analysis, descriptive statistics such as frequency distribution, percentages, mean, standard deviation and Likert type scale were used to describe the socio-economic and institutional characteristics, various agricultural activities women are involved in and the constraints to women participation in agricultural activities. The Five-point Likert rating was used, the mean score were computed as follows: $5+4+3+2+1=15/5=3$. Using an interval scale of 0.05, the upper limit is 3.05 while the lower limit is 2.95. Scores equal to or above 3.0 were considered as serious constraint while those equal to or below 2.95 were regarded as not serious constraints following ORANU *et al.* (2018). The level of participation of women in agricultural activities was ascertained using participation index. The index was constructed using four indicators of size of the land, status of participation, reason for engagement and duration of participation in farm activities presented in Table 2.

Table 2. Indicators of Participation.

Score	Size of the land	Status of participation	Reason for engagement	Duration of participation
1	Small scale (< 2 ha)	Part-time	subsistence	< 5 years
2	Medium scale (2 – 5 ha)	Full- time	commercial	5-10 years
3	Large scale (above 5 ha)		Both	> 10 years

The index was then re-categorized as: $> 0 LP \leq 4 =$ low level of participation =1; $> 4 LP \leq 8 =$ Moderate level of participation= 2; $> 8 LP \leq 10 =$ High level of participation = 3.

The drivers of women participation in agricultural activities were determined using Ordered Logit regression model. The Ordered logit regression model was employed because the dependent variable is of ordinal categorical nature derived from an index of participation on agricultural activities as high = 3, moderate = 2, low = 1. The ordered logit model is built around a latent regression in the same manner as the binomial probit model.

$$Y^* = \beta' x + \Sigma i \quad (\text{Equation 2}).$$

Where:

Y^* is the underlying latent variable that indexes the level of participation of women in agricultural activities, X is a vector of parameters to be estimated and Σ is the stochastic error term. The latent variable exhibits itself in ordinal categories, which could be coded as 0, 1, 2, 3, .., j.

The response of category j is thus observed when the underlying continuous response falls in the j^{th} interval as:

$$Y = 0 \text{ if } Y^* \leq 0$$





$$Y= 1 \text{ if } 0 > Y^* \leq \partial_1$$

$$Y= 2 \text{ if } \partial_1 > Y^* \leq \partial_2$$

$$Y=3 \text{ if } \partial_2 > Y^* \leq \partial_3$$

$$Y= j \text{ if } \partial_{j-1} \leq Y^* \leq \partial_j$$

Which is a form of censoring with the ∂ 's being unknown parameters to be estimated with β (GREEN, 2000). The implicit and explicit forms of the regression models are specified in equation 3 and 4.

$$\text{Participation index (Y)} = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, \dots, X_n) \quad (\text{Equation 3})$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \mu \quad (\text{Equation 4})$$

Where:

Y = Participation index (high = 3, moderate = 2 and low = 1); X_1 = Age of women (years); X_2 = Household size (number); X_3 = Marital status (married = 1, other = 0); X_4 = Level of Education (years); X_5 = Farming experience (years); X_6 = Distance to woman's farm from home (kilometer); X_7 = Disposable income of the woman (N); X_8 = Extension services received (Extension index) Extension index = Number of agricultural seminars and workshops attended + Number of visit of extension workers to the respondents farm + Number of respondent visit to extension office. i.e ASW + NVEW + RVE; X_9 = Membership of association/cooperative (Number of associations); X_{10} = Tenure right (1 if the woman farmers has permanent land rights and 0 otherwise); μ = Error term β_0 = Constant term; $\beta_1 - \beta_{10}$ = Parameters to be estimated.

Results and discussion

The socio-economic and institutional characteristics of women farmers

The result of the socio-economic and institutional (membership of association/cooperative, extension services and access to credit) characteristics of women farmers is presented in Table 3, which revealed that majority of the farmers accounting for over 70 % are within the age range of between 21-50 years with mean of 44 years. This implies that they are still in the active and youthful age and therefore could participate actively in various agricultural activities that require physical efforts. This result is in accordance with the findings of Tijani and Tijjani (2019) who opined that large population of women farmers fell within the agricultural productive age. On the level of education, Table 3 revealed that about 30 % of the farmers had no any form of education. Meanwhile over 60 % had basic education that is either primary or secondary education. And only 12.89 % had educational qualification to tertiary level, with mean of 7 years of schooling. It can be seen that there is at least fair level of education among the women farmers. This result is in line with the findings of Oladejo, Olawuyi and Anjorin (2011) who reported that more than half of women farmers in Osun State had fair formal education. Most of the farmers (80 %) had household sizes of above 5 with mean of 8 members. This indicated that farm households in in this study are fairly large. This could motivate the women to engage in different agricultural activities so as to take advantage of the potential labour supply and to also support with





the family needs from the output. The result in Table 3 further revealed that majority of the women farmers (80 %) had farming experience of more than 10 years with average of 18 years. This implies that the women had good share of farming experience. This result agrees with the finding of Owolabi, Abubakar and Amodu (2013) who found out that women farmers in Kaduna State are highly experienced in farming.

Table 3. Socio-economic and Institutional Characteristics of the Women Farmers (n = 636).

Variables	Frequency	Percentage	Mean (Std. dev.)
Age (years)			
≤ 20	3	0.47	
21 - 30	105	16.52	
31 - 40	158	24.84	
41 - 50	190	29.87	
> 50	180	28.30	44 (12.7)
Level of education (years)			
None	146	22.96	
Primary	200	31.45	
Secondary	202	31.76	
College of Agriculture	18	2.83	
College of Education	38	5.97	
College of Technology	6	0.94	
Polytechnic	15	2.36	
University	5	0.79	
Adult Education	4	0.63	
Quranic	2	0.31	7 (5.2)
Household size (number)			
1-4	98	15.41	
5-8	272	42.77	
9-12	137	21.54	
13-16	88	13.84	
> 16	41	6.44	8 (4.3)
Farming experience (years)			
< 10	140	22.01	
10-20	287	45.13	
21-30	109	17.14	
31-40	52	8.17	18 (12.7)
> 40	48	7.55	
Marital status			
Married	495	77.83	
Single	14	2.20	
Widow	114	17.92	
Divorce	13	2.04	
Membership of association (number)			
None	408	64.15	
1	99	15.57	
2	93	14.62	
3	36	5.66	
Farm size (ha)			
< 2	276	43.40	
2-5	213	33.49	
> 5	147	23.11	3.1 (2.7)
Extension services (number of visit)			
No contact	267	41.98	
1-5	358	56.29	



6-10	11	1.73	1 (1.6)
Access to credit			
No	532	83.65	
Yes	104	16.35	
Amount of credit accessed (N)			
None	532	83.65	
< 50,000	6	0.94	
50,000 – 100,000	73	11.48	
101,000 – 200,000	9	1.41	
> 200,000	16	2.52	40,416

Source: Field survey, 2021.

Based on the marital status, over 70 % of the farmers were married indicating that they could be more responsible and reliable which could propel them to participate in agricultural activities in order to support or carter for their family needs which is in accordance with the findings of Uzokwe, Ofuoku and Dafe (2017) who reported that large proportion of women that participated in agricultural activities are married. Table 3 also revealed that 64.15 % of the farmers were not members of cooperative societies and or community-based organisations, which is quite contrary to expectation given the enhanced enlightenment and the premium government placed on such organisations as a pivotal for development-assisted programmes. For example, Soyemi (2014) revealed that high membership of cooperative among the women farmers in North Central Nigeria can takes care to some extent the information needs of the farmers. As such, they lose benefits associated with membership of organisations like access to incentives, loan and information that could enhance their participation in agricultural activities and improve their productivity.

On the farm size, majority of the farmers had farm sizes of between 0.5 ha to 5 ha with mean of 3.1 ha, thus, they are subsistence-oriented farmers. Osanyinlusi and Adenegan (2016) affirmed that majority of women farmers in Ekiti State had 1 - 3 hectares of farm land. Based on the access to credit, 83.65 % of the farmers had no access to any form of credit and only 15.41 % could accessed credit of above ₦ 50,000 with mean of ₦ 40,416. This implies that majority of the women farmers were constraint by unavailability of credit which is expected to influence their participation in agricultural activities. This finding is in accordance with that of Tijani and Tijani (2019) who opined that lack of credit is a major problem facing farmers in Nigeria.

The various agricultural activities in which women farmers are involved in

The result of the various agricultural activities in which women farmers are involved in are presented in Table 4, which revealed that 99.53 % were into crop farming. Followed by livestock farming which accounted for 62.89 % and then agricultural trading was ranked third accounting for 56.60 %. Other agricultural activities carried out by women in Nigeria were poultry farming, horticultural farming and aquaculture farming which were ranked 4th, 5th and 6th respectively. This result is agreement with the findings of Sallawu (2021) who found out that crop farming constitute the most important agricultural activity among farmers in Nigeria, followed by livestock farming.



**Table 4.** Distribution of women based on agricultural activities (N=636).

Activities*	Frequency	Percentage	Ranking
Crop farming	633	99.53	1
Livestock farming	400	62.89	2
Agricultural trading	360	56.60	3
Poultry farming	160	25.16	4
Horticultural farming	23	3.62	5
Aquaculture farming	9	1.42	6

Note * multiple responses. Source: Field survey, 2021.

The level of participation of women farmers in agricultural activities

The results of the level of participation of women farmers in agricultural activities in presented in Table 5, which revealed that 49.06 % of the women had high level of participation, 44.50 % had moderate level of participation, while only 6.45 % of the women had low level of participation in agricultural activities. This result indicated that the women farmers are actively involved in agriculture which also implies that the women farmers contribute immensely to agricultural production in Nigeria. This result is in accordance with the findings of Luqman *et al.* (2012) who affirmed that women play a pivotal role in farming with high level of participation in a range of activities.

Table 5. Women farmers' level of participation in agricultural activities.

Participation level	Frequency	Percentage
Low	41	6.45
Moderate	283	44.50
High	312	49.06

Source: Field survey, 2021.

Drivers of women participation in agricultural activities

The estimates of the drivers of women participation in agricultural activities are presented in Table 6. The results shows that women farmers' level of participation in agricultural activities can be increased if an additional member joins the household either through birth or through immigration, raising the log odds by 1.9 %, 1.5 % and 0.5 % of lower, moderate and higher level of participation respectively. The level of participation can be increased if an unmarried woman becomes married which gives credence to the earlier assertion that married farmers could be more responsible. The being married is expected to cause an increase in odds log of 4.2 %, 3.5 % and 1.2 % respectively. Another possible reason for this, might be due to the fact that in many societies' women have limited land ownership before marriage due to financial and sometimes cultural barriers. This could be the reason why unmarried women have lower participation when compared to married women who may be able to participate in farming through their husband's land. Married women usually have family responsibility which could prompt their full involvement in agriculture. This agrees with Firafis (2016) who reported that being married contributed positively to agricultural activities in rural district of Dendi West Zone and Shoa Zone of Ethiopia.

Acquiring a higher level of education tends to increase participation of women by 0.8 %, 0.6 % and 0.2 %





respectively. This tends to affect the ability of the women farmers to understand new technologies and the rate at which they are able to cope with the complexities attached to new innovations or technologies as reported by Jiriko (2015) that education enable farmers to understand new technologies and access information through various channels.

A year increase in farming experience of the women farmers tends to increase their participation by 0.4 %, 0.4 % and 0.1 % respectively. Farming experience is an indicator of the practical knowledge of farming gained through regular farming over a period of time. This experience would assist the women in farm decisions as reported by Uzokwe, Ofuoku and Dafe (2017). They confirmed that increase in years of farming is a major boost to women participation in agriculture.

A kilometre increase in the distance of the farmers' home to the farm tends to decrease women participation in agriculture by 2.4 %, 1.9 % and 0.6 % respectively. The possible reason for this decrease might be due to other household chores and strength of the women to travel far and at the same time work on the farm. Also, an additional Naira increase in the disposable income of the women tends to increase their participation in agricultural as the sole aim of engaging in any livelihood activity is to earn higher income. By receiving additional extension visit, the women can increase their participation in agriculture as extension visits gives farmers access to innovation and information.

Table 6. Estimates of Ordered Logit Regression on drivers of women participation in agricultural activities.

Variables	Coefficients	Std Error	Z-value	Marginal effects (dy/dx)		
				Low	Moderate	High
Age	-0.001	0.006	-0.21			
Household size	0.098***	0.016	6.29	0.019	0.015	0.005
Marital status	0.225*	0.135	1.67	0.042	0.035	0.012
Level of education	0.042***	0.012	3.64	0.008	0.006	0.002
Farming experience	0.036***	0.006	4.21	0.004	0.004	0.001
Distance to farm	-0.127***	0.039	-3.18	-0.024	-0.019	-0.006
Disposable income	0.351***	0.086	4.10	0.066	0.054	0.019
Extension services	0.117***	0.039	2.95	0.022	0.018	0.006
Membership of association	0.348***	0.060	5.79	0.065	0.053	0.018
Tenure right	-0.057	0.123	0.46			
/cut1	3.581	0.942				
/cut2	5.509	0.955				
Log likelihood	-439.015					
Chi ²	244.01					
Prob > Chi ²	0.0000					
Pseudo R ²	0.2175					
No. of observations	636					

Significant codes: '***' at 1 %, '**' at 5 %, '*' at 10 %. Source: Field survey, 2021.

If the farmer joins additional cooperative and or community-based organisation, there is likelihood that participation in agricultural activities could be increased. Association membership serves as a driving force because collective efforts of farmers is beneficial to its members in aspects of farm labour, input supply, credit, processing and marketing of farm produce. This result is in line with Soyemi (2014) who reported that





membership of association is very key to farmers participation in agriculture because it is the first point of call for extension agents as its easier to reach larger number of farmers in a group rather than individually.

Constraints to women participation in agricultural activities

Results of the constraints to women participation in agricultural activities are presented in Table 7. The result shows that the women farmers agreed with the following as the serious constraints that hinders their participation. These are inadequate financial opportunities ($\bar{X} = 4.26$) was ranked first, inadequate access to extension services ($\bar{X} = 4.17$), inadequate capital ($\bar{X} = 3.94$), inadequate awareness on some agricultural activities like snail and bee farming that could be of immense benefit to the farmers ($\bar{X} = 3.90$), inadequate access to productive resources ($\bar{X} = 3.88$), inadequate knowledge on improved technologies ($\bar{X} = 3.78$) and inadequate training ($\bar{X} = 3.48$). While the less serious constraints identified by the farmers were inadequate access and ownership of land ($\bar{X} = 2.72$), cultural barriers ($\bar{X} = 1.96$), family issues ($\bar{X} = 1.82$) and religious barriers ($\bar{X} = 1.48$). This result is in line with the findings of Aneke and Alio (2018) who reported that inadequate extension services, inadequate capital, access to productive resources which are required for effective practices of agriculture are some of the challenges faced by women farmers.

Table 7. Constraints faced by women farmers in participating in agricultural activities.

Constraints	Very serious Freq (%)	Serious Freq (%)	Not sure Freq (%)	Not serious Freq (%)	Not very serious Freq (%)	Weighted sum	Weighted Mean	Ranking	Remarks
Inadequate financial opportunities	326 (51.57)	205 (32.23)	64 (10.06)	33 (5.19)	6 (0.94)	2714	4.26	1	Serious
Inadequate access to extension services	328 (51.57)	186 (29.25)	47 (7.39)	56 (8.81)	19 (2.99)	2656	4.17	2	Serious
Inadequate capital	306 (48.11)	157 (24.69)	18 (2.83)	142 (22.33)	13 (2.04)	2509	3.94	3	Serious
Inadequate awareness	280 (44.03)	171 (26.89)	67 (10.53)	83 (13.05)	35 (5.50)	2486	3.90	4	Serious
Inadequate access to productive resources	271 (42.61)	175 (27.52)	62 (9.75)	99 (15.57)	29 (4.56)	2468	3.88	5	serious
Inadequate knowledge on improved technologies	281 (44.18)	179 (28.14)	27 (4.25)	57 (8.96)	92 (14.47)	2408	3.78	6	Serious
Inadequate agricultural training	253 (39.78)	121 (19.03)	31 (4.87)	146 (22.96)	85 (13.36)	2219	3.48	7	Serious
Inadequate access & ownership of land	131 (20.60)	121 (19.03)	20 (3.14)	172 (27.04)	192 (30.19)	1735	2.72	8	Not serious
Cultural barriers	59 (9.28)	40 (6.29)	10 (1.57)	238 (37.42)	289 (45.44)	1250	1.96	9	Not serious
Family issues	77 (12.11)	52 (8.18)	4 (0.63)	51 (8.02)	452 (71.07)	1159	1.82	10	Not serious
Religious barriers	1 (0.16)	3 (0.47)	6 (0.94)	281 (44.18)	345 (54.25)	942	1.48	11	Not serious

The study concludes that women farmers in Nigeria engaged themselves in agricultural activities such as crop farming, livestock farming, agricultural trading, poultry farming, horticultural farming and aquaculture farming. More so, the women farmers were actively involved in agriculture which also implies that the women farmers contribute immensely to agricultural production in Nigeria having 49.06 % of the women with high





level of participation, 44.50 % with moderate level of participation, while only 6.45 % of the women had low level of participation in agricultural activities.

The study further concludes that the positive drivers of women participation in agricultural activities were household size, marital status, level of education, farming experience, disposable income, extension service and membership of association. Whereas distance to farm is a negative driver of women participation in agricultural activities in the study area. In addition, inadequate financial opportunities, inadequate access to extension services, inadequate capital, inadequate awareness on some agricultural activities, inadequate access to productive resources, inadequate knowledge on improved technologies and inadequate training were the serious constraints that hindered women participation in agricultural activities. The study therefore recommended that women farmers' education/training should be given utmost attention by the government as it influences their participation in agriculture.

The farmers should be encourage by extension agents to form associations or cooperatives in form of enlightenment on the benefit associated with it. Government and non-governmental organization should ensure that women farmers are provided with the need extension services as it influences their participation in agricultural. Financial institutions should assist in providing low interest loan to women farmers so as to increase their production level.

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Conflict of interest

The authors declare that the research was conducted in the absence of any potential conflicts of interest.

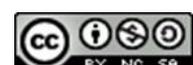
Ethical statements

The authors confirm that the ethical guidelines adopted by the journal were followed by this work, and all authors agree with the submission, content and transfer of the publication rights of the article to the journal. They also declare that the work has not been previously published nor is it being considered for publication in another journal.

The authors assume full responsibility for the originality of the article and may incur on them, any charges arising from claims, by third parties, in relation to the authorship of the article.

Authors declare on the approval of the Ethics Committee for studies involving human beings including studies with questionnaires, that such studies do not need the approval of the Ethics committee in any University in Nigeria but subject to the respondent's willingness to voluntarily provide what is requested of them and the researchers' guarantee of confidentiality and use of collected data solely for research purpose.

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