

Full Length Research Paper

Factors Influencing Rural Women Farmer's Participation in Pearl Millet (*Pennisetum glaucom*) production in Katsina State, Nigeria

Umar, S.*, Fadiji, T. O., and Ajah, J.

Department of Agricultural Extension and Rural Sociology, Faculty of Agriculture, University of Abuja, FCT, P.M.B. 117, Abuja, Nigeria.

*Corresponding Author E-mail: ladypheenarh@yahoo.co.uk

Received 19 November 2022; Accepted 22 December 2022; Published 3 January 2023

ABSTRACT: Pearl millet (*Pennisetum glaucum*) is the world's sixth most important cereal crop, following wheat, rice, maize, barley, and sorghum; it is adapted to arid and semi-arid environments and performs well in low soil fertility conditions. The study used Katsina State as a case study to determine the participation of rural female farmers in pearl millet production in Northern Nigeria. The study's 300 participants were chosen using a multi-stage sampling technique. The data was gathered using a questionnaire, and the results were analyzed using percentages, mean scores, and multiple regression. The analysis revealed that the majority of respondents (74.5%) were married, with 30.7% being between the ages of 31 and 40. The results also revealed that 37.1% of respondents had 1 to 5 years of farming experience, 30.8% had 6 to 10 years of farming experience, and the majority (45.5%) had no formal education. Furthermore, 68.1% of respondents had farms ranging in size from 1-3 hectares, and the respondents' average annual income was N255, 216.44. The results also show that land preparation and weed control were the most popular activities among the women farmers in the study area, accounting for 96.6% and 96.3% of the responses, respectively. The multiple regression analysis revealed that household size and education level were all significant at the 1% probability level. The most difficult challenge that rural women face in millet production is bureaucracy in obtaining loans. Other constraints include insufficient funds, pests and diseases, high labor costs, high maintenance costs, and limited access to extension agents. It was however recommended that financial institutions simplify the loan application process for farmers, particularly rural women, and that the government ensure that inputs such as fertilizer are readily available to women farmers at reasonable prices.

Keywords: Millet, women farmers, participation

INTRODUCTION

The sixth-most significant cereal crop in the world after wheat, rice, maize, barley, and sorghum is pearl millet (*Pennisetum glaucum*) (Rao et al., 2018). It performs better than other common cereals like maize and wheat and is adaptable to arid and semi-arid areas. It also works rather well under poor soil fertility circumstances (Shah et al., 2012). According to FAOSTAT (2020), approximately 22 million hectares of land in Africa are

used for pearl millet production, with a mean productivity of one ton per hectare. In Nigeria, the average millet yield under the smallholder production system is estimated to be around 1.55 tons per ha, compared to a potential yield of 3.00 tons per ha under research conditions (FAOSTAT, 2020). In Nigeria, pearl millet is mainly grown in the savannah regions which are characterized by not-so-fertile soils, low and erratic rainfall, as well as high

temperatures This yield gap is caused by biotic and abiotic constraints, as well as socioeconomic challenges. The most significant biotic challenges in pearl millet production are parasitic weeds (mostly striga species), bird damage, head miner, downy mildew, and others.. The abiotic factors include drought and low soil fertility (Drabo *et al.*, 2019). Other factors or challenges in millet production include primitive cultural practices, discrimination by gender in the access to basic farm, level of participation of both men and women in production activities, and so much more.

Rural female farmers make significant contributions to agricultural production in Katsina and Nigeria as a whole; with recent economic development, growth, and increased literacy farming techniques and skills, rural women can also advise their husbands on the adoption of new farming techniques and skills, and even assist in effecting good agricultural production decisions (Ayodele, 2012). Despite these acknowledged and lauded areas of involvement, corresponding efforts to include women farmers in most agricultural development policies, practices, remuneration, and incentives have not been made (Ayodele, 2012).

Objectives of the study

The aim of the study is to determine the participation of rural female farmers in millet production in the Northern Nigeria, using Katsina State as a case study. The specific objectives of this research work include to:

- i. Describe the socio-economic characteristics of rural women farmers in the study area.
- ii. Identify the millet production activities the rural women engage in.
- iii. Analyze the socio economic factors that influence the participation of women in millet production.
- iv. Determine the constraints rural women farmers face in millet production.

METHODOLOGY

Study area

The study was carried out in Katsina State, Nigeria. The state stretches across the three ecological zones namely Sahel savannah in the north, Sudan savannah in the middle and northern guinea to the south. It is bounded to the north by Niger Republic, to the east by Jigawa State and Kano State to the west by Zamfara State and to the south by Kaduna State. It is located between latitudes 11°08'N and 13°22'N and longitudes 6°52'E and 9°20'E, covering an area of 23,938 km². The state forms part of the extensive plains known as the high plains of Hausa

land. The state is composed of undulating plains, which generally rise gently from 360m in the northeast around Daura, to 600m around Funtua in the southwest.

Population of the study

The population of the study is women farmers involved in millet production the study area.

Sampling technique

Multistage sampling technique was employed to select the 300 respondents. In the first stage, a purposive sampling was used to select Katsina State, being a major millet producing state. Secondly, six local government areas in Katsina State, namely (Batsare, Rumi, Bindawa, Zango, Bakori and Kafar) were chosen. Thirdly, one village/community was chosen in each L.G.A. Fourthly, the use of proportionate random sampling technique was used to select twelve per cent (12%) of the population from the list of female farmers obtained from the Agricultural Development Programme (ADP). This gave a total of three hundred (300) respondents for the study.

Method of data collection

Primary data were used for the study and these were collected through the use of structured questionnaire, administered to the respondents by the researcher.

Method of data analysis

Both descriptive and inferential statistics tools were used for data analysis. Objectives 1, 2 and 4 were achieved using descriptive statistics.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The result of the socio economic characteristics of the women farmers in Table 1 reveals that most (74.5%) of the respondents were married, while the rest were either single, divorced or widowed. Marriage comes with responsibility, which means that people are more responsible and intentional about their farming activities. Owolabi *et al.* (2011) posited that trend in this result showed that married women farmers will possibly be able to attract support from their male counterparts. The household distribution of the respondents reveals that majority (35.1%) of the respondents had between 6-10 persons living in their household. The women farmers with large household size can effectively deploy family labour, which will imply that they will spend less on hired labour. The result further shows that the average age of

Table 1: Socio-economic characteristics of the respondents.

Socio Economic Variables	Frequency	Percent (%)	Mean
Marital status			
Married	219	74.5	
Single	37	12.6	
Divorced	7	2.4	
Widowed	27	9.2	
Household size			
1-5	38	15.6	
6-10	103	35.1	
11-15	53	18.0	13.44
16-20	49	16.7	
21 or more	43	14.6	
Age (years)			
20 and less	16	5.4	
21-30	56	19.1	
31-40	93	30.7	39.93
41-50	71	24.2	
51-60	46	15.6	
60 and above	12	4.1	
Farming experience (years)			
1-5	109	37.1	
6-10	63	21.4	
10-15	41	13.9	12.71
16-20	31	10.6	
21-25	13	4.4	
26-30	13	4.4	
30 and above	24	8.2	
Educational qualification			
No formal education	134	45.5	
Primary education	32	10.9	
Secondary education	55	18.7	
Tertiary education	73	24.8	
Farm size (hectares)			
less than 1	46	15.6	
1-3	200	68.1	2.35
4-6	33	11.5	
7-9	3	1.1	
10 and more	11	3.7	
Income (₦)			
less than 100000	149	50.9	
110000-500000	122	41.6	255216.44
510000-1000000	12	4.1	
1100000 and above	10	3.4	
Access to credit			
Yes	180	61.2	
No	114	38.8	
Access to Extension Services			
Yes	200	68.0	
No	94	32.0	
Membership of cooperatives			
Yes	180	61.2	
No	114	38.8	

Computed from field data, 2021

the respondents was 39.93 year, which implies that most of them were still within the productive active age, which means they can effectively engage in farming activities. Age is a factor that can significantly affect the productivity of farmers and their enterprises. The average years of farming experience of the respondents is 12.71 years. Table 1 further reveals the educational qualification of the respondents and from the result it was found that most (45.5%) of the respondents either had no formal

education. However, 24.8% of the respondents had tertiary education while 18.7% of the respondents had secondary education. This result agrees with Agwu *et al.* (2012) who found that the more educated people are, the less they tend to participate in agriculture.

The findings reveal that the average farm size of the respondents is 2.35 hectares and had an average income of ₦255, 216.44. Table 1 also reveals that 61.2% of the women farmers had access to credit in the study area.

Agricultural credit is very important, and can lead to rapid agricultural development, especially when they are accessible to women farmers. Also, Table 1 shows that 68.0% of the respondents had access to extension services while 61.2% of the women farmers were members of cooperative societies.

Millet production activities engaged in by women farmers in the study area

Table 2 shows the participation of women in millet production activities in the study area. The result shows that the activities most participated in by the women farmers in the study area were land preparation and weed control with 96.6% and 96.3% of the respondents respectively. This result aligns with the assertions of Khan *et al.* (2012) who found that women farmers participate in land preparation activities more than other crop production activities in the farm. The result also reveals that 95.9% of the respondents participated in timely harvesting while 94.9% participated in planting of improved seeds and manure application. The result however shows that the activity that had the least participation by women farmers in the study area was the use of recommended pest control measures.

Table 2: Millet production activities engaged in by women farmers in the study area.

Millet production activities	Frequency*	Percent (%)
Land preparation	284	96.6
Planting of Improved Seed	279	94.9
Fertilizer Application	276	93.9
Manure Application	279	94.9
Weed Control	283	96.3
Pest Control Measures	257	87.4
Timely Harvest	282	95.9

Computed from field data, 2021; *Multiple responses were allowed

Socio economic factors that influence the participation of women in millet production in the study area

Table 3 shows the result of the regression analysis on the effect of socio economic factors on the participation of women in millet production in the study area. The result shows an R^2 value of 0.53 which means that 53% of the variations in the dependent variable can be predicted by the independent variables. The remaining 47% was due to error or variables not captured in the model. The f-statistic is 3.225 and significant at 1% probability. This implies that the model was correctly stated and the independent variables correctly predict the dependent variable. The result shows that household size and level of education were both significant at 5% probability level.

The result of the regression analysis shows that household size was significant at 5% probability and had a positive relationship with the participation of the respondents on millet production in the study area. This implies that the level of participation of women farmers in millet production is positively influence by household; so increase in household size will lead to more participation in millet production by woman farmers in the study area. Oladejo *et al.* (2011), in their study, found that household size of women positively influence their participation in production activities. Also, level of education was positive and significant at 5% probability. Hence, as level of education increases, so does participation in millet production increases among the women farmers. This implies that the higher the educational level of farmers, the more likely they would be involved in large production because of their better exposure to information and better opportunities on improved seeds, loan and credit facilities etc. Farmers who are educated are likely to easily adopt new technologies and practices and they majorly constitute the innovators and early adopters of new innovations and practices which can help improve productivity. The result agrees with the finding of Agwu *et al.* (2012) who found out in their study that education is a significant factor in facilitating participation in productive activities.

Table 3: Regression analysis of the socio economic factors that influence the participation of women in millet production.

Model	B	Std. Error	T-value	p-value
(Constant)	1.015	0.038	26.704	0.000
Household Size	0.001	0.001	-2.211	0.028*
Marital status	-0.008	0.006	-1.326	0.186
Age	0.001	0.001	1.077	0.282
Level of Education	0.012	0.005	-2.434	0.016*
Membership of cooperatives	-0.009	0.011	-.763	0.446
Farming experience	0.000	0.001	-.370	0.712
Income from millet	-1.301E-009	0.000	-.194	0.846
Access to credit	-0.018	0.011	-1.568	0.118
Access to extension	-0.017	0.012	-1.428	0.154
Farm size	-0.002	0.002	-1.229	0.220

*significant at 5%

$R^2 = 0.53$, f-statistic = 3.225 and significant at 1%

Computed from field data, 2021

Constraints rural women farmers face in millet production

The result in Table 4 shows the constraints facing rural women farmers in millet production in the study area.

Table 4: Constraints rural women farmers face in millet production.

Constraints	SA(4)	A(3)	D(2)	SD(1)	Mean Score
Herdsmen and farmers clashes	65	81	56	81	2.37
Inadequate funds	44	216	10	3	2.89
Bureaucracy in accessing credits	130	111	21	3	3.06
Inadequate fertilizer	70	174	26	5	2.92
Pest and diseases	32	210	29	8	2.80
Poor access to extension agent	36	147	92	2	2.62
Distance to the market	42	163	57	7	2.64
High cost of labour	38	191	47	2	2.79
High cost of maintenance	30	196	43	6	2.72

Computed from field data, 2021

The result reveals that bureaucracy in accessing loan is the biggest challenge faced by the respondents with a mean score of 3.38, which is higher than the average mean score of 2.5. Bureaucracy refers to the collective organizational structure, protocols, procedures, and set of regulations in place to manage the process of acquiring loans from financial institutions. This agrees with Staudt (2019) who stated that women farmers have less access to agricultural loans than their male counterparts.

Also, inadequate fertilizer for cultivation, with a mean score of 2.92, is another major constraint faced by the respondents in the study area. Fertilizer increases the yield, quality and profit; and this means that inadequate fertilizer can affect the yield of the respondents. Other constraints faced by the respondents include inadequate funds (2.89), pest and diseases (2.80), high cost of labour (2.79), high cost of maintenance (2.72), and poor access to extension agent (2.62).

Conclusion

Majority of the rural women involved in millet production were young and married women, and most of them have little or no formal education. The women farmers are experienced in farming and have access to credit and extension services, most of them are members of cooperative societies. There is also high participation among the women on all the millet production activities in the study area. The participation of women in millet production activities in the study area is however influenced by the household size of the respondents and their level of education. Meanwhile bureaucracy in accessing credits was the major constraint to the participation of women farmers in millet production. Also, inadequate fertilizer, inadequate funds, pest and diseases, high cost of labour, among others were part of the challenges faced by the women farmers. This research has contributed to the advancement in knowledge in the aspect of the relationships that exist between the participation of rural women in millet

production and their socio economic characteristics in Katsina State, Nigeria, the production activities they participate in, and the constraints they face in participating in the production activities. The study serves as a benchmark for further studies and researches on similar subjects, because even though the study was conducted in just one state, the socioeconomic indicators and variables of women in this study can be taken as a pointer to the conditions in other states, especially within the region, in Nigeria as a whole.

Recommendation

In line with the findings of this study, the following recommendations were made:

- Financial institutions should ensure that the process of acquiring loan is simplified for farmers, especially rural women.
- The government should ensure that inputs like fertilizer are readily available to women farmers at affordable prices.
- Quality extension programmes targeting rural women should be designed by the government and private organization involved in extension service delivery.

REFERENCES

- Agwu, N. M., Nwankwo, E. E. & Anyanwu C. I. (2012). Determinants of Agricultural Labour Participation among Youths in Abia State, Nigeria. *International Journal of Food and Agricultural Economics*, 2(1), 157-164.
- Ayodele, A. (2012). Economic information of women food crop farmers' Contributions to food security in southwestern Nigeria: A stochastic frontier approach. *Nig. J. Rural social*, 13(2), 8.
- Drabo, I., Zangre, R. G., Danquah, E. Y., Ofori, K., Witcombe, J. R. & Hash, C. T. (2019). Identifying famers' preferences and constraints to Pearl Millet production in the Sahel and North-Sudan zones of Burkina Faso. *Exp. Agric.*, 55, 765-775.
- FAOSTAT. (2020) FAOSTAT Online Database 2020; FAO: Rome, Italy.
- Khan, M., Sajjad, M., Hameed, B., Khan, M. N. & Jan, A. U. (2012). Participation of women in agriculture activities in district Peshawar. *Sarhad Journal of Agriculture*, 28(1), 121-127.
- Oladejo, J. A., Olawuyi, S. O. & Anjorin, T. D. (2011). Analysis of women participation in agricultural production in Egbedore local government area of Osun State, Nigeria. *International journal of agricultural economics and rural development*, 4(1), 1-11.
- Owolabi J. O., Abubakar B. Z. & Amodu, M. Y. (2011). Assessment of Farmers (Women)' Access to Agricultural Extension, Inputs and Credit Facility in Sabon-Gari Local Government Area of Kaduna State. *Nigerian Journal of Basic and Applied Science*, 19(1), 87- 92.
- Rao, V. N., Rao, K., Gupta, S., Mazvimavi, K., Kumara, C. D., Nagaraj, N., Singh, R., Singh, S. & Singh, S. (2018). Impact of ICRISAT Pearl Millet Hybrid Parents Research Consortium (PMHPRC) on the Livelihoods of Farmers in India; Research Report No 75; ICRISAT: Patancheru, India.
- Shah, I. A., Shah, S., Zahir, S., Saeedur, R. & Muhammad, N. (2012). Characterization of pearl millet germplasm for various morphological and fodder yield parameters. *Pak. J. Bot.*, 44, 273-279.
- Staudt, K. A. (2019). Women farmers and inequities in agricultural services. In *Women and work in Africa* (pp. 207-224). Routledge.