



ROLES OF RURAL WOMEN FARMERS IN RICE PRODUCTION IN TAFAWA BALEWA AND BOGORO LOCAL GOVERNMENT AREAS OF BAUCHI STATE, NIGERIA

Lumi, Y., Yakubu, S. and Murtala, N.

Department of Agricultural Economics,

Faculty of Agriculture and Agricultural Technology, ATBU Bauchi.

Corresponding Author's Email: yosipolmi@gmail.com, **GSM:** 08035690143

ABSTRACT

The study examined the roles of rural women farmers in rice production in Tafawa Balewa and Bogoro Local Government Areas of Bauchi State, Nigeria. A multi-stage sampling technique was used to select 291 respondents. Data were collected using structured questionnaire and analyzed using descriptive statistics and farm budget analysis. The results showed that rice production is dominated by older women, with 25.4% aged 48–57 years and 24.7% aged 57 years and above. Household size distribution revealed that 26.5% of the women had 9 members and above, while 24.7% had 1–2 members. Farming experience was substantial, with 25.4% having 8–15 years and 22.0% having 24–31 years of experience. Income levels were relatively high, as 82.1% earned ₦1,400,001 and above annually. Women demonstrated high involvement in weeding (mean = 3.1), milling (3.1), harvesting (3.0), and land preparation (3.0). Cost and returns analysis indicated that the respondents incurred a total cost of ₦1,467,550, generated ₦1,794,850 as revenue, resulting in a gross margin of ₦431,200 and a net farm income ratio of 0.3. The study confirms that rural women are central to rice production, but face barriers such as limited land control, high input costs, and restricted market access. Strengthening access to productive resources and gender-responsive agricultural support is essential to optimize womens' contributions and improve rice productivity in the region.

Keywords: Rural, Women, Rice, Farmers, Role

INTRODUCTION

The rice sector plays a critical role in conserving foreign exchange and improving the nation's economy as it serves as a staple food for approximately 2.6 billion people worldwide. Rice is the leading cereal crop in South and East Asia where over 92% of global output comes from; while America accounts for 5% and Africa accounts for only 3%. It provides more than one-fifth of calories consumed worldwide despite having relatively lower protein content compared to other cereals (Oladimeji, 2017). Generally, large scale production of rice was neglected or given little attention because of several factors including high importation of foreign rice, large scale smuggling and dumping of rice, differences in the quality of locally produced rice and foreign rice. Other internal factors include inadequate infrastructural facilities, high cost of production, lack of apt technology and inaccessibility to financial assistance. The impact of rice production to Nigeria economy has attracted mixed debates among several scholars. For instance, recent studies (Damola, 2020; Abah, Ochoche & Hundu, 2021; Hussaini, Oladimeji, & Sanni, 2019) showed that rice production and cultivation contribute significantly to the economy.

Rural woman farmer plays an important role on the economic development of Nigeria because 73.2% of rural women workers are farmers. Women farmers perform most of the farming activities. These woman farmers in the rural area do work on land but they legally don't own the land. The woman in rural Tafawa Balewa and Bogoro L.G.As have multiple responsibilities like doing household chore, then taking care of their children and then also taking care of the land that is owned by their husband, father, father-in-law or any male relatives (Raman, 2019). Role of women in agricultural sector can't be ignored as they consist of 33% agricultural labour force and 48% self-employed farmers. In developing countries like Nigeria, agricultural sector continues to employ and absorb female workforce but most of the times fails to give them the proper recognition of an



employed or hired labour instead it is made a part of their household chore. Rural women are resource economic agents who contribute to the income of families and the growth of communities in a multitude of ways. They work as entrepreneurs, as farm and non-farm labourers, in family businesses, for others and as self-employed; while they take on a disproportionate share of unpaid work at home. However, their contribution is limited by unequal access to resources as well as persistent discrimination and gender norms which need to be addressed to allow the realization of their full potential (FAO, 2020).

Despite their significant contributions to agricultural production and food security, rural women farmers in Tafawa Balewa and Bogoro L.G.As of Bauchi State face numerous challenges that limit their ability to fully participate in economic development. These constraints include; limited access to land ownership and control, inadequate access to credit and financial services, inadequate training and technology, gender-based discrimination and social exclusion, heavy workload and time, poverty, limited market access and poor prices for their products among other. Rural women farmers are unable to realize their full potential as agents of economic growth and development, and are often relegated to subsistence-level farming with limited opportunities for income generation and improvement of their livelihoods. This situation perpetuates gender inequality, poverty, and food insecurity, and hinders the overall economic development of the region. The problem is further complicated by the fact that rural women farmers are often invisible in policy and development initiatives, and their specific needs and concerns are not addressed. Therefore, it is essential to investigate and address the constraints faced by rural women farmers, and to develop strategies that empower them to play a more active and equitable role in economic development. The broad objective of the study was to access the role of women farmers in rice production in Tafawa Balewa and Bogoro L.G.As.

While the specific objectives of the study were to:

- i. describe the socio-economic characteristics of the rural women farmers in study area;
- ii. identify the roles of rural women in rice production;
- iii. Examine the cost and returns incurred by rural women farmers in rice production.

METHODOLOGY

The Study Area

The study was conducted in Tafawa Balewa and Bogoro L.G.As of Bauchi State. Tafawa Balewa and Bogoro L.G.As are local government areas in the Southern part of Bauchi State in northern Nigeria. Tafawa Balewa and Bogoro L.G.As almost have the same climate condition. The average annual temperature ranges from 59 to 98 degrees Fahrenheit, rarely falling below 54 or rising over 102. Tafawa Balewa and Bogoro area in Bauchi State experience a tropical climate with a distinct wet and dry season. Tafawa Balewa and Bogoro LGAs, like the rest of Bauchi State, have a tropical climate characterized by a wet season (rainy season) and a dry season.

Sampling Techniques and sample size

The study population comprises 104,691 individuals engaged in agricultural activities (Table 1). A multi-stage sampling procedure was adopted to ensure representativeness. First, the federal constituency areas of Tafawa Balewa, and Bogoro were purposively selected due to their high concentration of women actively participating in agriculture. Second, three administrative wards were strategically chosen: two from Tafawa Balewa, and one from Bogoro. Third, two villages were randomly selected from each of the three wards, resulting in a total of six villages for data collection. This stratified approach balances geographic diversity and ensures adequate representation of the target population.

The researcher adopted convenience sampling since the study intend to ensure some representativeness in the sample. The Krejcie and Morgan's (1970) formula was used to determine the sample size as follows;



$$S = \frac{X^2 \cdot N \cdot P(1-P)}{d^2(N-1) + X^2 \cdot P(1-P)}$$

Where;

n = sample size;

χ^2 = corresponding chi-square value at 95% confidence interval.

N = population size;

d^2 = Margin of error;

p = population proportion

In determining the sample size, the following variables were used:

Confidence interval = 95 %

d = Margin of error = 0.05

Calculating the sample size;

$$\begin{aligned} S &= \frac{3.841 \times 1200 \times 0.5(1-0.5)}{0.05^2(1200-1) + 3.841 \times 0.5(1-0.5)} \\ S &= \frac{3.841 \times 1200 \times 0.25}{0.0025(1199) + 3.841 \times 0.25} \\ S &= \frac{1152.3}{2.9975 + 0.96025} \\ S &= \frac{1152.3}{3.95775} = 291.2 \\ &= 291 \end{aligned}$$

Table 1: Sample Frame and Sampling Size

LGA	Selected Ward	Number of Village	Female Population	Number of Respondents
Tafawa	Bula	2	31,230	$31,230 \times 291/86,627 = 105$
Balewa	Lere	2	26,743	$26,743 \times 291/86,627 = 90$
Bogoro	Lusa	2	28,654	$28,654 \times 291/86,627 = 96$
Total		6	86,627	291

Data Collection

The study used structured questionnaire to collect information from the selected rural women farmers in the study area. The questionnaire was divided into sections; Section “A” contained items that captured the socio – economic characteristics of the respondents; section “B” captured roles of rural women in rice production; section “C” consist of questions on factors influencing rural women farmers participation in rice production; section “D” focused on current contributions of rural women farmers to rice production; section “E” captured of constraints affecting women farmers in rice production in the study in Tafawa Balewa and Bogoro Local Government Areas. The questionnaire was administered to women who are engaged in agricultural activities in the study area.

Data Analysis

Both descriptive and farm budget analysis were used to achieve the objectives. Descriptive statistics such as; frequency, distribution and percentages were used to achieve objectives i and ii. While farm budget analysis was used to achieve objective iii.



RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

The result from Table 2 shows that half (50.1%) of the respondents fell within age group of 48 years and above, with 25.4% within the ages of 48–57 years and 24.7% were within 57 years and above. The finding further shows that 19.9% were aged 18–27, 17.9% were 28–37, 12.0% were 38–47. This finding indicates that rice production is dominated by active and older women who rely on farming as a stable livelihood source. Older women often possess extensive indigenous knowledge, which enhances production decisions; however, they may experience physical limitations. Usman and Ahmed (2021) similarly indicated that farming in northern Nigeria is increasingly dependent on older women due to youth migration.

The finding also shows that 26.5% and 24.7% of the respondents had household sizes of 9 persons and above and 1-2 persons. The result also shows that 22.3% had 3-4 persons, 13.7% had 7-8 persons and 12.7% had 5-6 persons, respectively. This finding implies that women with large households may achieve greater labour efficiency but also need income stability to support dependents. Large households imply the availability of cheap family labour, which reduces production costs. Yusuf and Ibrahim (2022) found that larger households strengthen labour availability for women farmers but also increase dependency burdens. The finding also shows that 25.4% and 22% of the respondents had 8-15 years and 24-31 years of farming experience, while 18.6% had 1-7 years, 17.9% had 32 years and above with 16.2% having 16-23 years of farming experience in the study area. This finding implies that experienced farmers are better positioned to take advantage of improved agronomic techniques. Kareem and Nuhu (2022) reported that farming experience enhances readiness to adopt technologies.

Table 2: Quantitative Socioeconomic Characteristics of the Respondents (n=291)

Variables	Frequency	Percentage
Age		
18-27	58	19.9
28-37	52	17.9
38-47	35	12.0
48-57	74	25.4
57 and Above	72	24.7
Household size		
1-2	72	24.7
3-4	65	22.3
5-6	37	12.7
7-8	40	13.7
9 and Above	77	26.5
Years of farming experience		
1-7	54	18.6
8-15	74	25.4
16-23	47	16.2
24-31	64	22.0
32 and Above	52	17.8
Annual income (₦)		
600,000-800,000	8	2.7
800,001-1,000,000	7	2.4
1,000,001-1,200,000	35	12.0
1,200,001-1,400,000	2	.7
1,400,001 and Above	239	82.1
Farm size (ha)		
0.5-1.5	59	20.3
1.6-2.5	66	22.7
2.6-3.5	53	18.2
3.6-4.5	96	33.0
4.6 and Above	17	5.8

The income distribution indicates that majority (82.1%) of the respondents earned ₦1,400,001 and above, while 12.0% earned ₦1,000,001–₦1,200,000, 2.7% earned between ₦600,000–₦800,000, 2.4% earned ₦800,001–₦1,000,000 with 0.7% earning ₦1,200,001–₦1,400,000. This finding implies that rice production as a lucrative economic activity, high income among women farmers suggests strong market performance and increased bargaining power. Similar profitability levels were reported by Chinasa and Ibrahim (2023) among women rice producers in northeast Nigeria.

The finding further reveals that 33.0% of the respondents had a farm size of 3.6–4.5ha of land under cultivation, 22.7% and 20.3% had 1.6–2.5ha and 0.5–1.5ha. The result also shows that 18.2% and 5.8% had 2.6–3.5ha and 4.6ha and above. This implies that women farmers had access to land for moderate rice production in the study area which further shows policies enhancing secure land tenure for women will significantly scale up production. This counters the stereotype that rural women cultivate small plots only. Ojo and Malami (2022) observed that women increasingly access land through lease arrangements.

Roles of Women in Rice Production

The result from Table 3 shows that women demonstrated strong and high level of involvement in major stages of rice production. Activities with high participation include weeding, milling, land clearing, land preparation, herbicide application, harvesting, and storage of broken rice, all with mean scores of 3.0 and above. This finding implies that empowering women through modern tools and labour-saving technologies would directly enhance production efficiency.

Table 3: Level of Involvement in Rice Production Activities among the Respondents

Variables	Mean	Decision
Land clearing	3.0	High
Land preparation	3.0	High
Weeding	3.1	High
Application of Herbicide	3.0	High
Harvesting	3.0	High
Milling	3.1	High
Storage of Broken	3.0	High
Storage of Milled grain	2.4	Medium
Planting	2.9	Medium
Application of Insecticide	2.9	Medium
Application of NPK fertilizers	2.8	Medium
Application of Liquid fertilizers	2.9	Medium
Application of Organic manure	2.7	Medium
Threshing/winnowing	2.9	Medium
Transportation	2.9	Medium
Parboiling	2.9	Medium
Marketing of Paddy	2.8	Medium
Marketing of Milled long grain	2.9	Medium
Marketing of Broken grain	1.4	Low
Storage of Paddy	1.5	Low

Mean score threshold <2.0=Low ≥3.0=High

This clearly indicates that women play dominant roles in labour-intensive stages, corroborating Abubakar and Tanko (2021) who found similar trends in northern rice-producing communities. The finding further shows that respondents' medium involvement was recorded in planting, fertilizer use, threshing, transportation, parboiling, and marketing of milled rice (means 2.8–2.9). These activities demonstrate women's centrality in both production and post-harvest operations. Ndirangu and Yakubu (2022) noted that women often carry the dual responsibility of production and processing, which increases their labour burden. This highlights the need for improved mechanization in post-harvest handling. Low involvement occurred in storage of paddy (1.5) and marketing of broken grains (1.4). These activities are typically controlled by men due to land ownership and market access structures. Gendered barriers continue to limit women's participation in certain commercial segments of the value chain. Mustapha and Bello (2023) found similar restrictions.

Profitability of Rice Production among Women Farmers

The result from Table 4 shows the cost and return analysis which provides a comprehensive understanding of the economic viability of rice production among rural women in the study area. The result indicates that the total cost incurred by the respondents amounted to ₦1,467,550, while the total revenue generated was ₦1,794,850, producing a gross margin of ₦431,200 and a net farm income ratio (NFI) of 0.3. These figures suggest that for every ₦1 invested in rice production, the women obtained a return of ₦0.3, which confirms the enterprise's profitability. This positive margin indicates that rice production is not only a subsistence activity but also a meaningful income-generating initiative capable of sustaining household welfare.

The profitability observed aligns with recent findings by Bala and Mohammed (2020), who reported similar income returns among women rice farmers in Bauchi State, emphasizing that rising domestic rice demand, favourable selling prices, and improved milling opportunities have boosted the profitability of smallholder rice farming. Likewise, Chinasa and Ibrahim (2023) found that women in northeastern Nigeria derive significant economic benefits from rice production due to growing urban markets and competitive farm-gate prices. These studies reinforce the evidence that rice remains one of the most economically viable crops within the regional agricultural landscape.



Table 4: Cost and Return Analysis per hectare of Rice Production

Variables	Amount (₦)	Percentage
Variable cost		
Land clearing	78,600	5.4
Seeds	121,000	8.2
Seed dressing chemical	35,300	2.4
Insecticides	65,850	4.5
Planting	68,500	4.7
Herbicides	122,950	8.4
Herbicide application	47,500	3.2
Fertilizer	175,000	11.9
Fertilizer application	65,950	4.5
Weeding	43,500	2.9
Harvesting	153,800	10.5
Threshing/winnowing	117,700	8.0
Bag/bagging	107,800	7.3
Transportation	160,200	10.9
TVC	1,363,650	
Fixed cost		
Tools	103,900	7.1
TFC	103,900	
TC	1,467,550	100
Revenue		
Sales of rice	1,794,850	
TR	1,794,850	
GM	431,200	
NFI	0.3	

Beyond confirming profitability, the result further highlights the efficient use of resources by the women farmers. The variable cost components such as herbicides, fertilizer, weeding, transportation, and harvesting were substantial, yet the high returns indicate effective investment in productivity-enhancing inputs. This is consistent with the observations of Ojo and Malami (2022), who argued that women who adopt improved inputs often achieve higher yields and better revenue returns despite facing credit and extension limitations. The ability of women farmers in this study to generate positive returns despite high production costs illustrates their resilience, careful expenditure planning, and ability to maximize resource-use efficiency even with limited capital. The implications of this profitability are far-reaching. First, it reinforces the economic value of women's agricultural labour and justifies investments in gender-responsive agricultural interventions. Second, profitability suggests the potential for expanding production if women can access improved technologies, irrigation facilities, and affordable credit. Third, the positive margins imply that rice production could serve as a pathway for poverty reduction and improved nutrition in rural households an observation also supported by Isaac and Mohammed (2023) and Kareem and Nuhu (2022). However, the relatively narrow margin between cost and revenue also indicates that women farmers remain vulnerable to price shocks, input inflation, and climate variability. Ensuring stable input supply chains, affordable mechanization, and expanded market opportunities is therefore essential for sustaining profitability in the long term.

CONCLUSION AND RECOMMENDATION

The study concludes that rural women in Tafawa Balewa and Bogoro LGAs play critical roles across major rice production activities and derive profitable income from the enterprise. Despite their high participation and demonstrated economic contributions, women remain constrained by limited access to land, inputs, credit, and support services. Enhancing women's access to productive resources



and strengthening agricultural support systems will significantly improve rice productivity and rural household welfare. Hence, it is recommended that;

- i. Government and microfinance institutions should establish accessible and low-interest credit schemes specifically designed to support women engaged in rice production.
- ii. Agricultural agencies should intensify women-focused training on improved agronomic practices, climate-smart production, and post-harvest technologies.
- iii. Community leaders and local governments should implement policies that expand women's rights to land ownership, leasing, and long-term use for agricultural purposes.

REFERENCES

- Abah, J., Ochoche, G., & Hundu, I. (2021). Assessment of rice production and its contribution to rural livelihoods in Nigeria. *Journal of Agricultural Extension and Rural Development*, **13**(2): 45–55.
- Abubakar, M., & Tanko, L. (2021). Gender roles and participation of women in rice production in Northern Nigeria. *Nigerian Journal of Agricultural Economics*, **15**(1): 87–99.
- Bala, A., & Mohammed, I. (2020). Economic assessment of women's participation in rice farming in Bauchi State. *Journal of Agricultural Research and Development*, **19**(2): 101–112.
- Chinasa, E., & Ibrahim, M. (2023). Profitability analysis of women rice farmers in Northeast Nigeria. *International Journal of Agricultural Economics and Management*, **10**(1): 60–72.
- Damola, A. (2020). Rice production and economic sustainability in Nigeria. *African Journal of Agricultural Sustainability*, **8**(3): 92–104.
- FAO. (2020). *The state of food and agriculture 2020: Women in agriculture*. Food and Agriculture Organization.
- Hussaini, A., Oladimeji, Y., & Sanni, L. (2019). Trends in rice production and food security in Nigeria. *Journal of Food Systems Research*, **11**(4): 77–88.
- Isaac, K., & Mohammed, L. (2023). Economic empowerment of rural women through rice production in northern Nigeria. *Journal of Development and Agricultural Policy*, **18**(1): 32–44.
- Kareem, R., & Nuhu, A. (2022). Effects of farming experience on technology adoption among women farmers in Nigeria. *Journal of Rural Studies and Development*, **14**(2): 55–68.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, **30**: 607–610.
- Mustapha, D., & Bello, S. (2023). Gendered barriers to women's participation in agricultural markets in Nigeria. *African Journal of Gender and Development*, **6**(2), 14–27.
- Ndirangu, P., & Yakubu, S. (2022). Women's dual roles in rice production and processing in rural communities. *Journal of Women in Agriculture*, **4**(1): 28–40.
- Ojo, O., & Malami, S. (2022). Impact of improved inputs on rice yield among women farmers in Northern Nigeria. *Nigerian Journal of Crop Science*, **9**(3): 112–121.
- Oladimeji, Y. (2017). Rice consumption and production patterns in West Africa. *Journal of Agricultural Economics and Development*, **6**(4): 34–43.
- Raman, P. (2019). Women farmers and agricultural labour dynamics in developing countries. *International Journal of Gender Studies*, **8**(1): 55–66.
- Usman, B., & Ahmed, A. (2021). Ageing population in agriculture: Implications for food production in Nigeria. *Journal of Rural Sociology*, **13**(1): 99–110.
- Yusuf, A., & Ibrahim, M. (2022). Household size and labour availability among rural women farmers in Nigeria. *Journal of Rural Economics and Development*, **5**(2): 74–83.