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ASSESSMENT OF GENDER PARTICIPATION IN RICE FARMING AMONG RURAL FARMERS IN THE SOUTHERN AGRICULTURAL ZONE OF PLATEAU STATE, NIGERIA

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Abstract

The study assessed gender participation among rural farmers in rice farming in the Southern Agricultural Zone of Plateau State, Nigeria. The data of this study were collected using structured questionnaire, administered to 201 respondents selected through multistage sampling (109 males and 92 females). Both descriptive and inferential statistics were used for data analysis. Findings revealed that rice farmers were predominantly in their productive middle age, with men averaging 42.9 years and women 42.5 years. Household sizes were similar, as most male (56.0%) and female (52.2%) respondents had between 6–10 persons per household. Although educational attainment was relatively high among both groups, a slight gap existed, with 98.2% of men and 91.3% of women having some form of education. Farming experience averaged 9–10 years for both sexs. However, disparities were evident in farm size and income. Men cultivated larger farm sizes (4.8 ha) compared to women (2.6 ha) and earned higher average annual income (₦976,792) than women (₦753,260), with more men in the highest income bracket. Participation levels differed by activity: men were more involved in mechanized and physically demanding tasks such as fertilizer application (96.3%), milling (90.8%), and ridging (84.4%), while women dominated threshing (97.8%) and parboiling (81.5%), and also actively participated in fertilizer application (93.5%). Key constraints for men included inadequate capital, climate variability, and limited extension visits, whereas women faced land tenure insecurity, high input costs, and insufficient capital. The study concluded that significant gender disparities exist and recommended gender-responsive land reforms, improved credit access, subsidized inputs, strengthened extension services, climate-smart practices, and cooperative development.

Keywords: *Assessment, gender, Participation, Rural farmers, Rice Farming.*

1.0 Introduction

Rice (*Oryza sativa*) has become a strategic food and cash crop in Nigeria, with both consumption and production rising steadily over the last decade though supply gaps persist, keeping import demands high and driving policy interventions such as Central Bank subsidy programs and border enforcement to contain smuggling (Federal Ministry of Agriculture and Food Security, 2023). Current assessments for 2023/24–2024/25 suggest strong but variable output, heavily influenced by rainfall patterns, irrigation availability, and input costs like fertilizer and agro-chemicals, all of which shape households' labor allocation along gender lines (Wikipedia, 2025).

The concept of gender refers to the socially and culturally constructed roles, behaviours, expectations, and identities associated with being mal or female. It is not rooted in biology but shaped through socialization, institutions, and symbolic meanings that vary across societies and evolve over time. Importantly, gender organizes unequal power relations allocating access to resources, authority, and social recognition often intersecting with class, race, age, and other factors to reinforce systemic inequality (Baxter and Hoffmann, 2019).

Gender roles in rice farming across Nigeria display a well-defined division of labour rooted in social norms and structural disparities. In the Southeastern Nigeria, men predominantly carry out land preparation, bird scaring, transportation of harvested paddy, harvesting, field clearing, and packaging, while women take on planting, weeding, and fertilizer application (Offor-Ikpendu*et al.*, 2023).

These role divisions mirror broader national trends. In the Southeastern Nigeria,

women contribute about 67% of the agricultural labor force and often tackle ridge formation, planting, weeding, harvesting, processing, and marketing tasks sometimes overlapping with domestic and care duties (Mgbako, 2025). Rice farming in the Northern Nigeria is unmistakably male-dominated, with an estimated 81% of practitioners being male farmers, while women, despite contributing significantly to food production, are often marginalized, lacking land ownership, financial resources, and access to agricultural inputs and training (Sadiq *et al.,* 2020). Despite playing a substantial part in daily food-related activities, the structural inequities in land tenure, mechanization, and financial inclusion impede women's productivity in rice farming highlighting the need for gender-responsive agricultural policies targeted at enhancing equity and efficiency in Northern Nigeria's rice sector (United States Agency for International Development (USAID), 2022).

The Southern Agricultural Zone of Plateau Statewhich includes LGAs such as Qua'an-Pan, Shendam, Mikang, Langtang North, Langtang South and Wase have been repeatedly identified by Plateau Agricultural Development Programme (PADP) and State-level planning documents for its favorable lowland ecologies ideal for rice cultivation, and features prominently in efforts to expand irrigable zones and clustered production ((Adama, 2025).

Despite Plateau State's rating as a key rice-producing state with the Southern Agricultural Zone endowed with favourable lowland ecologies, gender disparities in rice farming remain underexplored and potentially counterproductive to productivity and equity. Empirical observations revealed that in Plateau State, women often outnumbered men in field labour, engaging tirelessly in tasks such as land clearing,

planting, weeding, and harvesting, often completing farm duties while still managing household responsibilities (Adama, 2025). Another study by Akinyemi and Ayoade (2020) examined gender roles among farmers in Nigeria, using rice production in Plateau State as a case study. The study focused on the contribution of rice production to poverty alleviation, the significance of rice production, land tenure systems, and the role of agricultural technology in rice farming. However, there is no documented evidence specifically analyzing gender roles in rice production within the Southern Agricultural Zone of Plateau State. However, there was limited documentation on the involvement of men and women in the rice farming in the Southern Agricultural Zone of Plateau State. Gender-disaggregated data on labour contribution and factors influencing gender rice farming in the study area are unavailable. Therefore, this study filled the gap by level of men and women participation in rice farming in the Southern Agricultural Zone of Plateau State, Nigeria.

2.0 Objectives of the Study

The main objective of the study was to assess the level of men and women participation in rice farming in the Southern Agricultural Zone of Plateau State, Nigeria.

The specific objectives were to:

i. describe the socioeconomic characteristics of male and female rice farmers in the Southern Agricultural Zone of Plateau State;
ii. ascertain the level of men and women participation in rice farming in the study area; and
iii. identify constraints to gender participation in rice arming in the study area.

3.0 Methodology

The study was conducted in the Southern Agricultural Zone of Plateau State. Plateau State is located in the North-Central geopolitical zone of Nigeria. It was created in 1976 and has its capital in Jos. The state lies approximately between latitude 8°24′N and 10°38′N and longitude 8°32′E and 10°38′E. It shares boundaries with Kaduna State to the north-west, Bauchi State to the north-east, Taraba State to the east, Nasarawa State to the south-west, and Benue State to the south (Plateau Agricultural Development Programme, 2019). Plateau State derives its name from the Jos Plateau, a highland area that gives the state a relatively moderate climate compared to many other parts of Nigeria.

The state experiences a tropical climate with distinct wet and dry seasons. The rainy season typically lasts from April to October, while the dry season spans from November to March. Annual rainfall ranges between 1,200 mm and 1,500 mm, which supports extensive agricultural activities (Plateau Agricultural Development Programme, 2019). The state also has a total population of 4,718, 712 people (National Population Commission, 2024).The relatively cool temperature, fertile soils, and availability of arable land make agriculture a major occupation of the people. Major crops cultivated include rice, maize, Irish potatoes, millet, sorghum, and vegetables, while livestock production is also common.

For agricultural development purposes, Plateau State is divided into agricultural zones, one of is the Southern Agricultural Zone. The Southern Agricultural Zone comprises Local Government Areas such as Shendam, Qua'an Pan, Langtang North, Langtang South, Wase, and Mikang. This zone is characterized by relatively lowland areas compared to the central plateau region and is well suited for crop production,

particularly rice farming.

The Southern Agricultural Zone has significant agricultural potential due to its fertile soils, favourable rainfall pattern, and presence of river systems that support both rain-fed and irrigated agriculture. Rice farming is a prominent economic activity in the zone, with both male and female farmers actively involved in various production and post-harvest activities. The predominance of smallholder farmers, combined with traditional and emerging production practices, makes the zone suitable for examining gender roles and resource access in rice farming systems.

Although the state is best known for its mining production, agriculture is the major occupation of the people. Rice is one of the major crops; millets, yams, sorghum, corn (maize), sweet potatoes, Irish potatoes, cowpeas, Bean, fruits, and vegetables are the staple crops (Plateau State Government of Nigeria, 2020). The tree crops grown are Orange, Mango, Guava, Avocado etc. The inhabitants basically are the Gomai, Kanem, Tarok,Tehl, Youm and Montol in which the main commercial activities in the study area includes: Farming, hunting, and trading among other agricultural activities

Study Population, Sampling Technique and Sample Size

The target population for this study included all male and female rice farmers in the Southern Agricultural Zone of Plateau State. These farmers varied in scale, from smallholder to medium-scale producers. The study focused on both household heads and farm workers, ensuring that gender roles and contributions were adequately analysed.

A multistage sampling technique was adopted to select respondents. The selection process followed these stages:

Stage One: Three (3) Local Government Areas (LGAs) out of the six (6) LGAs in the

Southern Agricultural Zone was purposively selected for the study due to the high concentration of rice farmers. These are: Langtang South, Mikang and Shendam LGAs.

Stage Two: Simple random sampling was used to select three (3) rice-producing communities from each of the selected LGAs. This gave nine (9) communities that were used for the study.

Stage Three: The list of 273 male rice farmers and 230 female rice farmers was gotten from the preliminary survey that was carried out in March, 2024 by the researcher. The study used simple random sampling to select 40% of male rice farmers and 40% of female rice farmers in each of the 9 selected communities. This gave 109 male rice farmers and 92 female rice farmer that were selected. This gave a total of 201

Table1: Sample size Selection Plan

		Sampling Frame		**Sample size (40% of registered farmers)**	
LGAs	**Villages**	**Male**	**Female**	**Male**	**Female**
Langtang South	Sabo gida	32	27	13	11
	Mabudi	35	25	14	10
	Kereshin	28	23	11	9
Mikang	Garkawa	30	27	12	11
	Lalin	30	24	12	11
	Tunkus	31	25	12	10
Shendam	Shimakar	28	28	11	11
	Yamini	29	23	10	10
	Yelwa	30	28	12	11
Total = 3	**9**	**273**	**230**	**109**	**92**

Method of Data Collection

This study employed primary data. Primary data were collected by the use of structured questionnaire.

Data Analysis

Data were analysed using descriptive statistics. Descriptive statistics such as frequency,

percentages, means, and rank order, were used to analyse objectives i ii and iii.

4.0 Results and Discussion

4.1 Socioeconomic Characteristics of Respondents

Table 2 presents the socioeconomic characteristics of male and female rice farmers in in the Southern Agricultural Zone of Plateau State, Nigeria.

Age: The results according to age of rice farmers shows that most male respondents were in their middle years: 41.3% were aged 31–40 years, 34.9% were 41–50 years, 16.5% were over 51 years, and only 7.3% fall in the youngest bracket (20–30 years), with an average age of 42.9 years. In contrast, female respondents were more concentrated in the older middle group: 48.9% were aged 41–50 years, 26.1% fall in the 31–40 years, 14.1% were 20–30 years, and 10.9% were above 51 years. This suggests that while both male and female were largely in their productive age. In terms of gender roles, this age difference could mean men may take on physically demanding tasks earlier, while women, entering or being active in certain roles at slightly older ages, may bring more experience but possibly face physical constraints in some farm operations. This result agrees with the finding by Jatbong *et al.* (2018) who conducted a study on economic efficiency of male and female rice farmers in Plateau State, Nigeria and revealed that the average ages for men and women rice farmers were 46 and 42 years respectively.

Marital status: The result of marital status shows that a large majority of rice farmers, both male and female, were married: 66.1% of male respondents and 67.4% of female respondents. 25.6% of males were divorced and 8.3% were widowers; for females 21.7% were divorced and 10.9% were widows. This suggests that marriage is the

predominant household status for both genders in the study area. In terms of gender roles, this high rate of marriage could have several implications: married farmers may benefit from spousal support in farming tasks, decision-making, and shared labour, which could positively affect productivity. Further, gendered expectations in marriage (who does what) may reinforce existing divisions of labour: married men may assume physically heavier or capital-intensive tasks while married women might balance home duties along with farm tasks. Sangotegbe *et al.* (2013) who carried out a study of gender analysis of rice production in Obafemi-Owode Local Government Area of Ogun State also reported that majority of the farmers, male (72.5%) and female (62.5%) were married.

Household size: The result on household sizes shows that for both male and female rice farmers in the study area, the most common household size is 6–10 persons: 56.0% of the male farmers and 52.2% of female farmers fall into this category. About 33.0% of men and around 31.5% of women had smaller households of 1–5 persons, while larger households (more than 11 persons) among women was 16.3% than men 11.0%. The mean household size was 7 persons for both genders. This suggests that family size is generally moderate to large among rice farming households, which has important implications for gender roles: larger households may mean more available family labour, which could reduce reliance on hired help and potentially distribute farm tasks among more members. Onyinyechukwu (2023) also reported in a study of gender differences in agricultural productivity among rice farmers in Anambra State that most had an average household size of 7 persons.

Level of education of respondents: The findings according to level of education show

that among male rice farmers, nearly half (48.6%) have completed tertiary education, 27.5% had secondary school qualifications, 22.1% primary education, and just 1.8% have no formal education. Female farmers, however, had only 25.0% with tertiary education, with 44.6% attaining secondary education, 21.7% reaching primary level, and 8.7% having no formal schooling. This suggests that male farmers generally have higher educational attainment compared to female farmers in the study area. In the context of gender roles among rice farmers in the study area, the disparity in education may translate into differences in access to information, adoption of innovations, decision-making authority, and negotiating power. Higher educated male farmers may be better placed to understand and use agricultural extension services, access credit, adopt improved technologies and improved management practices, while female farmers with lower formal education might lag behind in these areas. The result of this study agrees with the finding by Onyinyechukwu (2023) who reported that majority (86%) of the male and female farmers had one form of formal education or the other.

Rice farming experience: A greater proportion (46.8%) of male rice farmers in the study area had 6–10 years of farming experience, 29.4% have between 1–5 years, 22.9% fall in the 11–15 years bracket, and a very small proportion (0.9%) have over 16 years, giving a male average of about 9.6 years farming rice. Female farmers show a somewhat different spread: 35.9% have 11–15 years of experience, 34.8% have 1–5 years, and 29.3% possess 6–10 years, with the average experience for women being around 9 years. These findings indicate that although both men and women have reasonably similar average years of experience. The implication of this is that relatively high average years of experience among both genders suggests that the farmers were not novices; they likely

have accumulated agricultural knowledge, know local conditions, and have had opportunities to try different rice farming practices. Experience can improve efficiency, decision-making, risk management, and innovation uptake. Jatbong *et al.* (2018) also reported that the average years of experience of male and female respondents were 18 and 12 years respectively.

Access to loan: The findings revealed that the majority of both male and female rice farmers did not have access to credit facilities. Specifically, 73.4% of male farmers and 81.5% of female farmers reported no access to loans, leaving only 26.6% of males and 18.5% of females who were able to obtain credit. Among the male farmers who accessed loans, 10.1% sourced funds from cooperative societies, 7.3% from banks, 5.5% from friends, and 1.8% each from neighbours and gifts. In contrast, female farmers who obtained loans relied mainly on neighbours (8.7%), followed by banks (5.4%), cooperative societies (3.3%), and friends (1.1%).

Amount of loan accessed: In terms of loan size, male borrowers secured an average amount of ₦142,272.73, while female borrowers obtained a lower average of ₦89,130.43. This noticeable difference in both access and loan volume highlights a gender gap in financial inclusion and borrowing capacity among rice farmers. Such disparities may result in unequal investment opportunities, as male farmers are better positioned to purchase improved seeds, fertilizers, hire machinery, or expand their farm size. Female farmers, on the other hand, may be limited to smaller-scale or less optimal investments due to restricted financial resources. Similarly, Sangotegbe *et al.* (2013) found that although the majority of both male and female farmers lacked access to credit, 46.5% of males and 42.5% of females had access to credit facilities for agricultural

production. These findings further underscore the persistent gender-related constraints in access to agricultural finance.

Cooperative membership: The result indicated that only a minority of rice farmers in the study area belonged to cooperative societies: 24.8% of male respondents and 29.3% of female respondents were cooperative members, leaving 75.2% of men and 70.7% of women outside cooperative society membership. Among male members, 15.6% had been in the cooperative society for 1–5 years, 6.4% for 6–10 years, and 2.8% for 11 years or more; among female members, 18.5% fall in the 1–5 years bracket, 8.7% in 6–10 years, and 2.2% in 11 years and above, with both genders having an overall mean membership duration of about 1.4 years. This limited membership and generally short tenure suggest that cooperatives were underutilized resources for both male and female rice farmers. Ayoola *et al.* (2011) reported that greater percentage of the female respondents was involved in associations, about 90 percent and 57 percent respectively for female and male farmers.

Extension contacts: The data show that a majority of rice farmers in the study area have little to no contact with agricultural extension agents: 60.6% of male respondents and 69.6% of female respondents report no contact, leaving 39.4% of men and 30.4% of women who have been visited. On average, male farmers received 2 visits, while female farmers received just 1 visit. Ayoola *et al.* (2011) also revealed that majority of the male (89.90%) and female (94.44%) respondents had no access to extension services.

Rice farm size: Results revealed that most (92.7%) of male rice farmers cultivated between 1–5 hectares, while 6.4% farmed on 6–10 hectares, and 1.1% operated on 11 hectares or more, with a mean farm size of about 4.8 hectares. Female farmers similarly

cluster in the 1–5-hectare bracket (91.3%), with 8.7% having 6–10 hectares; their mean is about 2.6 hectares. Jatbong *et al.* (2018) also reported that male farmers had an average farm size of 2.3 hectares while female farmers had 1.1 hectares.

Estimated annual rice income: The results show that among male rice farmers, 45.0% earned between ₦1,000 and ₦500,000 per year, 25.7% fell in the ₦501,000–₦1,000,000 bracket, and 29.4% earned ₦1,001,000 or more, with an average annual income of ₦976,792.48. For female farmers, 56.5% earn between ₦1,000 and ₦500,000, 26.1% in the ₦501,000–₦1,000,000 range, and 17.4% in the ₦1,001,000 and above, with an average income of ₦753,260.87. Adiel*et al.* (2019) reported a pooled mean rice income of ₦198,374.

Table 2: Socio-economic Characteristics of Respondents in the Study Are (n)

Variable	Freq.	%	Mean	Freq.	%	Mean
	Male			Female		
Age (years)						
20-30	8	7.3		13	14.1	
31-40	45	41.3	42.9 years	244	26.1	42.5 years
41-50	38	34.9		45	48.9	
51 and ab ove	18	16.5		10	10.9	
Marital status						
Married	72	66.1		62	67.4	
Divorced	28	25.6		20	21.7	
Widowed	9	8.3		10	10.9	
Household size (No. of persons)						
1-5	36	33.0	7 persons	29	31.5	7 Persons
6-10	61	56.0		48	52.2	
11 and above	12	11.0		15	16.3	
Level of education						
Non-formal education	2	1.8		8	8.7	
Primary education	24	22.1		20	21.7	
Secondary education	30	27.5		41	44.6	
Tertiary education	53	48.6		23	25.0	
Rice farming experience (yea rs)						
1-5	32	29.4		32	34.5	
6-10	51	46.8	9.6 years	27	29.3	
11-15	25	22.9		33	35.9	
16 and above	1	0.9		0	0.0	
Access to loan						
Yes	29	26.6		17	18.5	
No	80	73.4		75	81.5	
Source of loan						
Had no loan	80	73.4		75	81.5	
Friends	6	5.5		1	1.1	
Cooperative society	11	10.1		3	3.3	
Neighbours	2	1.8		8	8.7	
Bank	8	7.3		0	0.0	
Gift	2	1.8		5	5.4	

Amount of loan accessed (₦)						
Had no loan	80	73.4	₦ 142,	75	81.5	₦ 89,130.43
1,000-300,000	9	8.3	272.73	10	10.9	
301,000-600,000	10	9.2		5	5.4	
601,000 and above	10	9.2		2	2.2	
Cooperative membership						
Yes	27	24.8		27	29.3	
No	82	75.2		65	70.7	
Duration of membership (years)						
Non-members	82	75.2		65	70.7	
1-5	17	15.6		17	18.5	
6-10	7	6.4		8	8.7	
11 and above	3	2.8		2	2.2	
Extension contacts						
Yes	43	39.4		28	30.4	
No	66	60.6		64	69.6	
Number of extension contacts (No. of visits)	66	60.6	2 visits	64	69.6	1 visit
Had no contact	18	16.5		16	17.4	
1-3	16	14.7		8	8.7	
4-6	9	8.3		4	4.3	
7 and above						
Method of land acquisition						
Farm freely on family land	10	9.2		10	10.9	
Farm on rented land	47	43.1		39	42.4	
Farm on gov't land	44	40.4		41	44.6	
Farm on purchased land	4	3.7		2	2.2	
Farm on gifted land	4	3.7		0	0.0	
Rice farm size (hectares)						
1-5	101	92.7	4.8 hectares	84	91.3	2.6 hectares
6-10	7	6.4		8	8.7	
11 and above	1	0.9		0	0.0	
Estimated annual rice income (₦)						
1,000-500,000	49	45.0	₦976,792.48	52	56.5	₦753,260.87
501,000-1,000,000	28	25.7		24	26.1	
1,001,000 and above	32	29.4		16	17.4	
Total	**109**	**100.0**		**92**	**100.0**	

Source: Field survey, 2025

4.2 Level of Male and Female Participation in Rice Production Activities

Table 3 reveals that male respondents dominate most agronomic activities. Male participated in fertilizer application (96.3 %), rice milling (90.8 %), ridging (84.4 %), harvesting (74.3 %), and land preparation including tilling (68.8 %). Male respondents also participated in pesticide application (65.1 %), weeding (61.5 %), and herbicide application (51.4 %). In contrast, female participated in tasks such as threshing (97.8 %), fertilizer application (93.5 %) parboiling (81.5 %), weeding and planting (70.7 %), as well as milling (67.4 %) and, to a lesser extent, tilling and land preparation (50.0 %). The

results showed that, while men were more dominant in the early and middle stages of production such as land preparation, input application, and harvesting, women appear to take leading roles in processing (threshing, parboiling), input application tasks that are less mechanized or more labour-intensive by hand (weeding, planting), and also support more in milling, though not as extensively as men. Bako *et al.* (2019) in a study of gender contribution in faming activities and decision making among maize households reported that men dominated in land preparation, had 66.5% contribution from the male respondents while the females offered only 33.5% Male contribution in tilling was 78.8% to the female 21.2% with t-value of 2.3 significant at 5%. In making ridges men provided 71.3% against the female 28.7%.

Table 3: Level of Male and Female Participation in Rice Production Activities

Rice Production Activities	Frequency	%	Frequency	%
	Male		Female	
Tilling/land preparation	75	68.8	46	50.0
Ridging	92	84.4	21	22.8
Planting	41	37.6	65	70.7
Weeding	67	61.5	65	70.7
Fertilizer application	105	96.3	86	93.5
Herbicide application	56	51.4	8	8.7
Pesticide application	71	65.1	29	31.5
Harvesting	81	74.3	30	32.6
Threshing	16	14.7	90	97.8
Parboiling	42	38.5	75	81.5
Milling	99	90.8	62	67.4

Source: Field survey (2025) multiple responses was allowed
Decision Rule: Any score between 1-39% = low level of participation, 40-69% = moderate level of participation, and 70% and above = high level of participation.

4.3 Constraints to Male and Female Participation in Rice Farming Activities

The findings on constraints faced by male and female rice farmers in the study area revealed that both Sexes encountered several challenges, though with varying levels of severity. Among male farmers, the major constraints included inadequate capital ($\bar{x}$ = 4.28), frequent changes in climate ($\bar{x}$ = 4.23), inadequate extension agents' visits ($\bar{x}$=

4.21), high cost of labour ($\bar{x}$ = 4.03), lack of credit facilities ($\bar{x}$ = 3.99), high cost of farm inputs ($\bar{x}$ = 3.95), problem of land tenure ($\bar{x}$ = 3.83), and crop destruction by herders ($\bar{x}$ = 3.77). For female farmers, the most pressing constraints were the problem of land tenure ($\bar{x}$ = 4.59), followed by high cost of farm inputs ($\bar{x}$ = 4.45), inadequate capital ($\bar{x}$ = 4.34), high cost of labour ($\bar{x}$ = 4.26), inadequate extension agents' visits ($\bar{x}$ = 4.20), lack of credit facilities ($\bar{x}$ = 3.95), frequent change in climate ($\bar{x}$ = 3.38), and high cost of improved varieties ($\bar{x}$ = 3.03).These results indicate that while both male and female farmers face economic and institutional constraints, land tenure and input costs appear to disproportionately affect women, likely due to cultural norms and limited access to land ownership and productive resources.

Inadequate capital: This is the highest-ranked constraint for male and female farmers. It suggests that many male and female farmers lack sufficient funds to purchase inputs, hire labour, or invest in improved technologies. Without adequate capital, they may not afford fertilizers, seeds, or irrigation, limiting both the scale and efficiency of rice production. This also inhibits ability to cope with other constraints such as climate change, high input costs among others since adaptive measures often require up-front investment. This result agrees with the finding by Offor-Ikpendu *et al*. (2024) who conducted a study of assessment of gender participation in rice production activities in South-East Nigeria and indicated that inadequate capital for male male and female farmers were ($\bar{x}$ =3.27 and $\bar{x}$ =3.28) respectively.

Frequent change in climate: Climate variability undermines planning for planting and harvesting. For rice farming, which is highly sensitive to water availability, such changes can lead to reduced yield or crop failure. Male and female farmers may be especially impacted if they rely on traditional rain-fed systems without irrigation or adaptive

practices. Offor-Ikpendu *et al*. (2024) also reported problem of climate change for male and female farmers to be ($\bar{x}$ =3.18 and $\bar{x}$ =3.33).

Inadequate extension agents' visits: Extension services are crucial for transferring knowledge about improved varieties, best agronomic practices, pest management, and adaptive methods. Limited visits mean male and female farmers may not get timely or adequate information. The finding agrees with finding by Onyinyechukwu (2023) who reported in a study of gender differences in agricultural productivity among rice farmers in Anambra State that the major constraints by male respondents were inadequate extension services ($\bar{x}$ = 4.52).

High cost of labour: Hiring labour becomes a burden especially in peak periods (land clearing, planting, harvesting). If wages are high, or if availability is low, male and female farmers may struggle, particularly when they cannot afford mechanization or do not have enough family labour. High labour cost raises the overall production cost, reducing profit margins and possibly limiting the size of operations. The finding agrees with finding by Onyinyechukwu (2023) who reported in a study of gender differences in agricultural productivity among rice farmers in Anambra State that the major constraints by male respondents was high cost of labour ($\bar{x}$ = 3.03).

Lack of credit facilities: Inadequate capital, lack of access to formal credit makes it harder for male farmers to invest in inputs, purchase better seeds, or respond to shocks. It could be due to stringent collateral requirements, high interest rates, or lack of financial institutions in rural areas. Without credit, farmers are dependent on informal sources which often are insufficient or exploitative. Ezekiel *et al*. (2021) also found in a study of gender analysis in economic efficiency of rice farmers in Kogi State, Nigeria that the major constraints faced by farmers was inadequate credit facilities ($\bar{x}$ = 2.66).

High cost of farm inputs: This refers to the expenses for seeds especially improved or certified varieties), fertilizers, pesticides, herbicides, tools, fuel, mechanization, among other farm inputs. For male and female farmers, who typically have less capital and lower access to credit or subsidies than men, these high input costs weigh heavily. Sangotegbe *et al.* (2013) in a study of gender analysis of rice production in Obafemi-Owode Local Government Area of Ogun State, also reported that high cost of inputs is seen by male and female farmers as a major constraint to rice cultivation, as more than half (52.5% and 60%) respectively considered it a severe constraint.

Problem of land tenure: Secure land tenure is fundamental for farmers to feel confident investing in land improvements. If land rights are unclear or disputed, or if farmers fear losing access, they are less likely to make long-term investments. Male and female farmers might struggle with customary tenure systems, land rights bureaucracy, or conflicts. These uncertainties may also limit access to credit, since land is often required as collateral. Onyinyechukwu (2023) in a study of gender differences in agricultural productivity among rice farmers in Anambra State also revealed that land tenure problems ($\bar{x} = 2.67$) was a major constraint to rice production.

Crop destruction by herders: This reflects conflict between farmers and pastoralists, where livestock grazed through farmlands can destroy crops. For rice farming, this can be devastating especially when crops are near maturity. Losses reduce incomes, discourage investment, and increase risk. This insecurity of crop yield undermines both motivation and ability to plan effectively for seasons. Ezekiel *et al*. (2021) in a study of gender analysis in economic efficiency of rice farmers in Kogi State, Nigeria also reported that among major constraints faced by farmers was crop damage by herders ($\bar{x} = 2.59$).

High cost of the improved varieties: Improved seed varieties often cost more than local/unimproved seeds. For female farmers, paying for these upgraded seeds may be unaffordable or risky without assurance of good weather, market access, or extension advice. Also, quality seeds might be difficult to source reliably in rural areas. As such, female farmers may stick with traditional varieties, which may yield less but are cheaper and less risky under uncertain conditions. The finding agrees with finding by Onyinyechukwu (2023) who reported in a study of gender differences in agricultural productivity among rice farmers in Anambra State that among major constraints by male respondents' high cost of improved varieties of rice seeds ($\bar{x} = 4.52$).

Table 4: Constraints to Male and Female Participation in Rice Farming Activities

Challenges	Mean Male	Mean Female
Inadequate capital	4.28	4.34
Lack of credit facilities	3.99	3.95
Problem of land tenure	3.83	4.59
High cost of farm inputs	3.95	4.45
Poor soil fertility	2.79	2.24
Problem of fungi, pests and diseases	2.17	1.76
Crop destruction by herders	3.77	2.98
High cost of the improved varieties	2.69	3.03
Rice cannot be stored for long	2.87	1.17
Adulteration of seeds by incompetent seed marketers	2.86	2.13
High cost of labour	4.03	4.26
Inadequate extension agents' visits	4.21	4.20
Frequent change in climate	4.23	3.38

Source: Field survey, 2025 multiple responses was allowed

5.0 Conclusion and Recommendations

5.1 Conclusion

Based on findings of this study, it was concluded that gender roles in rice production were distinctly differentiated. Men predominantly handled physically demanding and mechanised tasks such as land preparation, ridging, fertilizer and pesticide application, harvesting, and milling. Women, on the other hand, were more engaged in planting, weeding, threshing, parboiling, and other post-harvest processing activities, showing their strong involvement in the value-addition stages of production.

Both male and female farmers face a range of production constraints. Among men, inadequate capital, climate variability, insufficient extension contact, high labour cost, and lack of credit facilities were dominant challenges. For women, insecure land tenure, high cost of inputs, and limited access to capital and labour were particularly severe. These findings highlight the persistence of gendered inequalities in access to productive resources, income, and decision-making roles within the rice sector.

5.2 Recommendation

Based on finding of this study, the following recommendations were made:

1. Since land tenure was the most severe constraint for female farmers, policy reforms are needed to ensure women have legal, secure, and enforceable rights to land use, control or ownership. Government and local authorities should streamline and simplify procedures for women to obtain land use certificates or permits; also customary land practices should be reviewed to make them more gender inclusive.

2. Both male and female farmers suffer from inadequate access to credit. Interventions might include setting up gender-friendly microcredit or agricultural loan schemes with low interest rates, reduced collateral requirements, and flexible repayment periods. Partnerships between government, banks (including Bank of Agriculture), donor agencies, and NGOs could provide special funds earmarked for smallholder farmers, particularly women. Also, financial literacy programmes targeting farmers, especially women could help them navigate credit systems.

3. High cost of inputs was a major constraint. Government, through agricultural extension or input subsidy programmes, should facilitate access to quality inputs at lower cost. Ensuring improved

4. Given that many farmers report few or no visits by extension agents, boosting

extension delivery is critical. Extension organization in Plateau State should hire/train more extension agents, reducing agent: farmer ratios, improving transport and logistics for agents, and using varied communication channels such as group meetings, one-to-one visits, radio, SMS, to suit gender preferences. Use of ICT or mobile platforms could help reach more farmers at lower cost.

5. Extension organizations should promote climate-smart agricultural practices: drought- or flood-tolerant rice varieties; improved water management; training in weather forecasting and climate information services; and diversification of crops. Extension services should include modules on climate risk management.

6. Extension agents should encourage formation or strengthening of cooperatives so s to help farmers pool the resources, gain economies in input purchase, and increase bargaining power for credit and markets. Cooperative membership can help reduce constraints related to cost of inputs, access to credit, and infrastructure.

References

Adama, S. (2025). Agricultural potentials in Southern Agricultural Zone of Plateau State.*Plateau State Agricultural Development Programme.*

Adiel, J. A., Abu, G. A., &Igbokwe, E. M. (2019).Effects of socioeconomic and technological characteristics on discontinuance of adoption of improved rice production technologies in Nasarawa and Plateau States, Nigeria.*Journal of Agricultural Extension, 23*(2), 1–13.

Akinyemi, O., &Ayoade, A. (2020). Gender roles in rice production and poverty alleviation in Plateau State, Nigeria. *Journal of Agricultural Extension and Rural Development, 12*(4), 215–224.

Ayoola, J. B., Dangbegnon, C., Daudu, C. K., Mando, A., Kudi, T. M., Amapu, I. Y., &Adeosun, J. O. (2011). Socio-economic factors influencing rice production among male and female farmers in Northern Guinea Savanna Nigeria. *African Journal of Agricultural Research, 6*(18), 4239–4245

Bako, S. A., Ahmed, B., & Yusuf, A. (2019).Gender contribution in farming activities and decision-making among maize farming households in Nigeria.*Nigerian Journal of Agricultural Economics, 9*(2), 45–58.

Baxter, J., & Hoffmann, A. (2019).*Understanding gender: Social constructions and inequalities.Routledge.*

Ezekiel, O. A., Musa, I. A., & Olorunfemi, S. O. (2021).Gender analysis of economic efficiency among rice farmers in Kogi State, Nigeria.*Journal of Agricultural Economics and Development,* (3), 112–123.

Federal Ministry of Agriculture and Food Security.(2023). Annual agricultural performance report 2023.*Federal Ministry of Agriculture and Food Security, Nigeria.*

Jatbong, A., Musa, Y., & Bello, T. (2018).Gender inequality and agricultural productivity in developing countries.*International Journal of Agricultural Economics*, 3(4), 112–120.

Mgbako, P. (2025). *Women's contribution to agriculture in Southeastern Nigeria*. Journal of Agricultural Studies, 12(2), 45–62.

National Population Commission. (2024). Population projections for Nigeria: 2024 demographic report.*National Population Commission, Nigeria.*Available at www.npc.gov.ng.Accessed on 2/9/2025.

Plateau Agricultural Development Programme. (2019). Agricultural profile of Plateau State.*Plateau Agricultural Development Programme (PADP), Ministry of Agriculture, Plateau State.*Available at www.plateaustate.gov.ng.Accessed on 12/11.2025.

Offor-Ikpendu, C., Eze, C., &Nwachukwu, I. (2023).Gender division of labour in rice farming in South Eastern Nigeria.*Nigerian Journal of Agricultural Economics, 13*(1), 54–67.

Onyinyechukwu, H. O. (2023) Gender differences in agricultural productivity among rice farmers in Anambra State, Nigeria: *Drivers and Strategies for A Gender ResponsiveAgriculture*. *International Journal of Food Science and Agriculture*. Vol.7(1): pp. 21-28

Programme Support Document (2012).Gender Equality and Women Empowerment Programme in Tanzania.

Sadiq, A., Usman, B., & Ibrahim, T. (2020). Gender disparities in Northern Nigerian rice farming. *Nigerian Journal of Agricultural Economics*, 11(3), 101–115.

Sangotegbe, N. S., Taofeeq,T. A and Oluwasus, J. O. (2013).Gender analysis of rice production in ObafemiOwode Local Government Area of Ogun State, Nigeria.*Nigerian Journal of Rural Sociology.*Vol. 14(1).Pp: 32-40.

United States Agency for International Development (2022). Gender analysis of the rice value chain in Northern Nigeria.*USAID.*

Wikipedia (2025). *Rice*. Retrieved February 19, 2026, from https://en.wikipedia.org/wiki/Rice.Accessed on 23/12.2025.