



## Factors Influencing Gender Accessibility to Productive Resources for Rice Production in Niger State, Nigeria

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### Authors' contributions

This work was carried out in collaboration between all authors. Author OSA designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors ASO, SA, GB and BDM managed the literature searches, analyses of the study and performed the spectroscopy analysis. All authors read and approved the final manuscript.

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### ABSTRACT

**Aims:** The aim was to analyze the factors influencing gender accessibility to productive resources for rice production in Niger State, Nigeria.

**Study Design:** Primary data were collected from 125 rice farmers with the aid of structured questionnaire.

**Place and Duration of Study:** This study was conducted in Lavun, Katcha and Gbako Local Government Areas of Niger State during 2015 cropping season.

**Methodology:** A multistage comprising purposive and random sampling techniques were used for data collection in this study. Descriptive statistics and logit regression was used in analyzing the data.

**Results:** The factors influencing gender accessibility to land resources were age, household size

and cooperative membership at  $P < 0.01$  and  $P < 0.10$  level. Seed resource were age, education and access to credit at  $P < 0.05$  and  $P < 0.01$  level while education, extension contact and household size were not statistically significant. The factors influencing gender accessibility to labour resource were age, household size, extension contact and access to credit at  $P < 0.05$  and  $P < 0.01$  level.

**Conclusion:** Based on the findings of this study, it suffice to note that gender accessibility to productive resources is important in attaining food security and realizing the poverty reduction strategies of African countries. Farmers in the study area have limited access to major productive resources, but the females were more constrained. Providing resources in an efficient and equitable manner appears to have potential for greatly improving the scope for future poverty reduction in Nigeria. Given the necessary resources and the same enabling environment as their male counterpart in farming activities, women farmers are equally efficient in the utilization of these resources to achieve higher productivity and also there is need for an aggressive approach to ensure that gender participation in agriculture is at an increasing rate.

*Keywords: Gender; rice production; Niger State; Logit regression.*

## 1. INTRODUCTION

Nigeria is the most populous African country with an estimated population of about 178.5 million people spread over both rural and urban communities [1]. The country was predominantly an agrarian society until 1970's when crude oil was discovered in commercial quantities which led to a complete neglect of agriculture until recent. Agriculture is the mainstay of country's economy, contributing about 42% to total GDP and employing about 77% of the working population [2].

Rice is an annual crop and the most important staple food crop in the tropical countries. Commercially, the crop is the most important cereal after wheat [3]. In Nigeria, rice is one of the few food items whose consumption has no cultural, religious, ethnic or geographical boundary. It is available in five-star hotels in the big cities and towns, as well as in the "most local" of the eating places in the remotest villages throughout the country [3]. Rice consumption has risen tremendously since 1970 (10.3 per cent per annum), a result of the accelerating population growth rate (2.8 per cent per annum) and increasing per capita consumption (7.3 per cent per annum) leading to an increase in domestic demand over domestic supply. In response to meeting the shortfall in the supply-demand gap, Nigerian government has continued to resort to importation of milled rice. This situation has made Nigeria to become the largest importer of rice in Africa [4]. Moreover, Nigerian Agriculture has been variously described as being characterized by low farm incomes, low levels of capacity to satisfy the food needs of the population and low productivity because primitive

techniques of production are still being used by the farmers [5,6].

In response to the prevailing rice supply deficit situation in the country, successive Nigerian governments have intervened in the rice sub-sector, by increasing tariff on rice importation so that local production could be encouraged. This was expected to widen the home market for the nation's local rice [7]. The inability of Nigeria rice sub-sector to meet the domestic demand could be attributed to low productivity, inefficiency in the use of resources, disincentives from macro-economic environment and production in the hand of small scale farmers who use traditional technologies. Nigeria has experienced falling yield of rice from 2069.54 kg per hectare in 1990 to 1754.40 kg in 2008 [8,9].

Gender has proven to be an essential variable for analyzing the roles, responsibilities, constraints, opportunities, incentives, costs and benefits in agriculture [10]. Gender relations are influenced by ethnic origin, age, religion, traditions, ideologies, societal perceptions as well as cultural and economic conditions. Gender gap is manifest in various facets of life. In agriculture, this include among others, access to and control of resources, as well as division of labour at the household level and among farming activities [11]. In addition to this, there is gap in decision making and this often turns out that in many cases, women use their land primarily for subsistence crops to feed their families while men cultivates cash crops and keep the income. Access to productive resources/inputs is an obstacles to agricultural growth in Africa, thus access to productive resources such as land, modern inputs, technology, education and

financial services is a critical determinant of agricultural productivity [12].

Access to resources is one of the elements of women's empowerment and a base for the attainment of the Millennium Development Goals (MDGs). Many international conferences have been held to improve rural women's equitable access to and control of land in recent years. The 4th World Congress of Rural Women, held in South Africa in 2007, reiterated the need to provide full and equal access for rural women to productive resources, including the right to inheritance and ownership of land and other property, credit/capital, appropriate technologies, markets and information [13].

However, women across all developing regions are consistently less likely to own or operate land; they are less likely to have access to rented land, and the land they do have access to, are often of poorer quality and in smaller plots. In addition to being more likely to hold land, men also typically control larger land holdings than women [14]. In terms of labour female farmers may receive help from male relatives, but only after the men have taken care of their own plots. The fact that female farmers typically farm smaller plots may not compensate for the lower availability of family labour, consequently women cultivate smaller plots and achieve lower yields [15].

There is dearth of gender disaggregated research and documentation data in rice production in Niger state. It is, therefore necessary to assess gender accessibility to resources among rice farmers in the study area; to establish benchmark for developing strategy for promoting gender equity in the accessibility to resources, involving rice farmers in the area. This becomes imperative to conduct this research which raises the following objectives:

- i. Describe the socioeconomic characteristics of rice farmers in the study area.
- ii. Determine the factors influencing gender accessibility to productive resources for rice production in the study area.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was conducted in Niger State of Nigeria. The State is in the northern part of

Nigeria and is located between latitudes 8°22'N and 11°30'E and longitudes 3°30'N and 7°20'E [16]. It covers a land area of 74,244 square kilometres which is about 8% of the country's land mass. The state had an estimated population in 2006 of 3,950,249 [17], and based on projections of population growth rate of 3% per annum, the population as at 2014 was 4,898,309.

The State is bounded in the North by Zamfara State, in the north-west by Kebbi State in the South by Kogi State, in the South-West by Kwara State, in the North-East by Kaduna State and in the south-east by the Federal Capital Territory. The State has a tropical climate marked by dry and wet seasons. The rainy season commences in April and ends in October. The dry season begins from November and ends in March. It has a mean annual rainfall of 1000 mm and mean temperature of 33.5°C [16].

The State is characterized by Guinea Savanna vegetation with the tree like sheabutter and locust beans [16]. More than 80% of the population is engaged in agricultural production activities [16]. The crops grown include rice, maize, ground-nut, cassava, sorghum, cotton, cowpea, pigeonpea, soybean and yam. Livestock kept include cows, goat, sheep poultry and fish. Niger State is also popular for its brass work, particularly in Bida, and for pottery, fishery, weaving and several cottage industries which can be found throughout the State. There are 3 prominent ethnic group in the state, namely, Nupe, Gbagi (Gwari) and Hausa. Other ethnic groups include Kambari, Kamuku, Kakanda, Gade, Pangu and Ingwai [16].

### 2.2 Sampling Procedure

Multi-stage sampling technique was employed in the selection of farmers for this study. A reconnaissance survey was conducted in Lavun, Katcha and Gbako. The first stage is the purposive selection of three local government areas in Niger State which are Lavun, Katcha and Gbako Local Government Areas. The purposive selection of these LGAs was due to their involvement in rice production in the state. The second stage was random selection of 10% of the sample frame (1252) for both male (751) and female (501) rice farmers in each village. In all, a total of one hundred and twenty-five farmers were randomly selected in the study area.

## 2.3 Data Collection and Analysis

Primary data were used for this study. These were collected with the aid of structured questionnaire, using interview method. The information was collected on (a) farmers' socio-economic characteristics such as age, household size, educational level, farming experience, amount of credit received, numbers of extension contact, cooperative membership, farm size and off-farm income. (b) Information on level of gender accessibility to productive resources such as fertilizer, seeds, land and labour.

## 2.4 Model Specification

The logit regression model is specified as:

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U$$

Where:

- Y = Accessibility to resources (1= access, 0= no access)
- X<sub>1</sub>= Age (years)
- X<sub>2</sub>= Level of education (years)
- X<sub>3</sub>= household size (number of people)
- X<sub>4</sub>= Extension contacts (number of times)
- X<sub>5</sub>= Membership of a cooperative (yes or no)
- X<sub>6</sub>= Credit (amount of credit received) (₦)
- U = Error term
- α<sub>0</sub>= Constant term
- β<sub>1-6</sub>= coefficients.

## 3. RESULTS AND DISCUSSION

The results in Table 1 showed that majority 73.3% and 58% of male and female rice farmers respectively were within 30-39 years with an average ages 39 and 38 years for male and female rice farmers respectively. Implication of these findings is that large proportions of the respondents were adults and can adequately be regarded as active, agile, and physically disposed to farming activities. This findings supports [18], that majority of the sampled farmers in their study were within the productive age of between 21 and 50 years.

Table 1 also revealed that majority 60.9% of male and 64.4% of female rice farmers had household size between 1-5 members with an average household size of 7 and 5 person respectively implying that there is appreciable number of family labour supply to accomplish

various farm operations. This finding is also in line with [19] who reported that an average household size of male farmers' household was found to be 5 persons while 4 persons for the female farmers.

The result shows that the majority (81%) of male and (70%) of female rice farmers do not have access to formal education while 19% of male and 30% of female rice farmers had one form of education or the other. This implies that the educational level of the farmer in the study area is low. The level of farmers' education is believed to influence the use of improved technology in agriculture and hence, farm productivity. Muhammed-lawal et al. [20] noted that level of education is expected to influence farmers' adoption of agricultural innovations and decision on various aspects of farming. They also maintained that education is highly important for sustainable agricultural growth and development.

The result in Table 1 revealed that the majority (82.7%) of male and (86.8%) rice farmers do not have access to extension contact while about 18% and 13% had contact with an average of once annually. The study revealed that the extension contact was very low in the area, as most of the respondent had never received an extension agent on their farms. The provision of agricultural extension can lead to significant yield increases. Yet, extension provision remains low for both male and female and women tend to make less use than men of extension services.

The results also showed that majority (89%) of male and 76% of female rice farmers do not belong to any farmers' association while 11% and 24% who belong to cooperative association ranges between 1-10 years for male and female respectively with an average years of membership were 2 and 3 years for male and female rice farmers respectively.

The results in Table 1 indicate that majority 90% and 84% of male and female rice farmers had no access to credit to finance their rice production activities while those who had access to credit accessed between ₦10,000 -₦40,000 which represent 10% and 26% respectively. However, a large number of farmers had no access to funds to finance their crop production activities, which in turn reduce their level of profit. The result reveals that commercial banks are less patronized for financial support for farming in the study area. This may be due to avoidance of high interest rate on collected loan. [21] asserts

that credit is a very strong factor that is needed to acquire or develop any enterprise; its availability could determine the extent of production capacity.

**Table 1. Socioeconomic characteristics of rice farmers**

Socio-economic characteristics	Male (N=75)	Female (N=50)
<b>Age</b>		
21-29	9(12.0)	8(16.0)
30-39	55(73.34)	29(58.0)
40-49	11(14.7)	12(24.0)
50-59	11(14.7)	1(2.0)
Mean	38	39
Minimum	24	22
Maximum	58	42
<b>Household size</b>		
1-5	45(60.0)	32(64.0)
6-10	21(28.0)	18(36.0)
11-15	7(9.3)	Nil
16-20	2(2.7)	Nil
Mean	7	5
Minimum	2	3
Maximum	18	9
<b>Education</b>		
No formal education	61(81.3)	35(70.0)
Primary education	8(10.6)	10(20.0)
Secondary education	4(5.3)	4(8.0)
Tertiary education	2(2.7)	1(2.0)
<b>Extension visit</b>		
No contact	62(82.7)	43(86.0)
1-3	8(10.7)	6(12.0)
4-6	4(5.3)	1(2.0)
7-9	1(1.3)	Nil
Mean	1	1
Minimum	1	1
Maximum	9	4
<b>Years of membership</b>		
No membership	66(88.5)	38(76.0)
1-5	8(10.3)	9(18.0)
6-10	1(1.1)	2(4.0)
11-15	Nil	1(2.0)
Mean	2	3
Minimum	1	1
Maximum	10	14
<b>Credit</b>		
No access to credit	68(90.7)	42(84.0)
10,000- 40,000	4(5.3)	4(8.0)
40,001- 80,000	2(2.7)	1(2.0)
80,001-120,000	1(1.3)	Nil
Mean	42,000	16,000
Minimum	10,000	10,000
Maximum	82,000	50,000

*Figures in parentheses are percentages*

### 3.1 Factors Influencing Gender Accessibility to Land Resource

The Logit regression model was used to estimate factors influence influencing gender accessibility to productive (land) resources for rice production in Niger state. The estimated coefficients of the Logit model, along with the standard error and t-values are presented in Table 2.

The likelihood ratio test was -63.259 for male and -59.341 for female with 5 degree of freedom is significant at ( $p \leq 0.01$ ). This implies that all the variables included in the Logit model are jointly significant in influencing farmers' access to land resources. Therefore, the socioeconomic characteristics of farmers have a significant effect on access to land resources. Table 2 shows that age, household size, cooperative membership and credit are statistically significant determinants of access to land resources.

The McFadden R-square of 0.41 and 0.28 for male and female rice farmers respectively, implies that 41 and 28 percent in the variability in accessibility to land resource in the study area was explained by the explanatory variables (age, household size, cooperative membership and credit) specified in the model. The F value of 31.24 and 28.69 were statistically significant at 1% probability level and this indicates the joint significance of the specified variables on gender accessibility to land resource in the study area.

Age were found to be positive and significantly influence access to land resource at 1% level of significant for both male and female. This implies age is a determinant factor in land acquisition in the study area. Age has been found to determine how active and productive the head of the household would be. Similarly, a unit increase for both male and female will lead to an increase in the odds in favour of the farmers' access to land resources.

Household size was found to be positive and significantly influence access to land resource among male farmers at 10% level of significant. This showed that household size influences farmers' accessibility to land resource for rice production. This might not be unconnected with the fact that land acquisition in the study area is through ownership by inheritance and traditionally land ownership is vested exclusively on males and also the typology of land tenure practiced in the study area. While household size was found not statistically significant for female rice farmers. This finding supports [19]

who reported that an average household size of male farmers' household was found to be 5 persons while 4 persons for the female farmers.

Cooperative membership was significant at 1% level of significant for the male farmers and insignificant for the females. The positive relationship indicates that accessibility to land resource increase as a result of belonging to a cooperative society. The non-significance of membership of cooperative society among the female farmers may be explained by the leadership's inability to source for agricultural assistance for its members to acquire land resource. This finding supports [22] found membership of cooperative enable farmers to acquire more farm inputs.

Access to credit was found to be positive and significantly influence accessibility to land resource among the female farmers who engaged in rice production at 10% level of significant and insignificant for the males. The implication of this is that increase in credit accessibility would enhance farmers' accessibility to land. This suggests that availability of credit is an important factor in resource accessibility among the rice farmers. [21] asserts that credit is a very strong factor that is needed to acquire or develop any enterprise; its availability could determine the extent of production capacity.

### 3.2 Factors Influencing Gender Accessibility to Seed Resource

The estimated coefficients of the Logit model, along with the standard error and t-values are presented in Table 3.

The likelihood ratio test was -94.213 for male and -86.654 for female with 5 degree of freedom is significant at ( $p \leq 0.01$ ). This implies that all the variables included in the Logit model are jointly significant in influencing farmers' access to seed resources. Therefore, the socioeconomic characteristics of farmers have a significant effect on access to seed resources. Table 3 shows that age, education, and credit are statistically significant determinants of access to seed resources.

The McFadden R-square of 0.54 and 0.47 for male and female rice farmers respectively, implies that 54 and 47 percent in the variability in accessibility to land resource in the study area was explained by the explanatory variables (age, education and credit) specified in the model. The F value of 24.18 and 27.24 were statistically significant at 1% probability level and this indicates the joint significance of the specified variables on gender accessibility to seed resource in the study area.

Age of the rice farmers were found to be positive and significantly influence access to seed resource at 5% level of significant for both male and female. This implies that increase in age to a certain extent would increase farmers' access to seed resources. Age has been found to determine how active and productive the head of the household would be. Age is also associated with skills enhancement (experience), accumulation of resources and extensive social capital that ought to contribute positively to well-being [23].

**Table 2. Factors influencing gender accessibility to land resource**

Variables	Male			Female		
	Coefficient	St. error	t-value	Coefficient	St. error	t-value
Constant	0.091	0.251	0.363	0.221	0.164	1.495
Age	0.571	0.001	10.529***	0.215	0.001	3.636***
Education	-0.031	0.024	-1.304	-0.025	0.024	-1.054
Household size	0.020	0.011	1.825*	0.015	0.015	0.997
Extension visit	0.020	0.017	1.169	0.021	0.018	1.152
Membership of cooperative	0.173	0.066	2.624***	-0.091	0.087	-1.053
Access to credit	-0.048	0.067	-0.723	0.124	0.060	2.059**
Numbers of observation	75			50		
Log likelihood ratio test	-63.259			-59.341		
McFadden R-square	0.43			0.28		
F- distribution	31.24***			28.69***		

\*\*\* =  $P < 0.01$ ; \*\* =  $P < 0.05$ ; \* =  $P < 0.010$

**Table 3. Factors influencing gender accessibility to seed resource**

Variables	Male			Female		
	Coefficient	St. error	t-value	Coefficient	St. error	t-value
Constant	0.208	0.138	1.507	0.902	0.618	1.459
Age	0.040	0.017	2.352**	0.041	0.018	2.222**
Education	0.181	0.068	2.661***	0.785	0.189	4.153***
Household size	0.793	0.852	0.930	0.564	0.667	0.846
Extension visit	-0.020	0.017	-1.169	-0.021	0.018	-1.152
Membership of cooperative	0.785	0.504	1.558	0.356	0.323	1.103
Credit	0.843	0.310	2.719***	-0.311	0.223	-1.395
Numbers of observation	75			50		
Log likelihood ratio test	-94.213			-86.654		
McFadden R-square	0.54			0.47		
F- distribution	24.18***			27.24***		

\*\*\* =  $P < 0.01$ 

Educational status of rice farmers were found to be statistically significant at 1% level of significant for both male and female rice farmers. This implies that as the level of education of rice farmers increased, their accessibility to seed resource will also increase *ceteris paribus*. A plausible explanation for this is that higher educational level leads to high rate of adoption of improved technologies and techniques of production. Also, educated farmers are likely to be more successful in gathering information and understanding new practices.

Access to credit was found to be positive and significantly influence accessibility to seed resource among the male farmers who engaged in rice production at 1% level of significant and insignificant for the females. This means that, increase in credit would increase male farmers' access to seed. The reason deduced why this result is insignificant for the female farmers as against a priori expectation; is not too far from the fact that the female farmers had less accessibility to credit. The females cannot afford to acquire seeds compared to the males who on the other hand had the means and can also acquire larger quantities of seeds.

### 3.3 Factors Influencing Gender Accessibility to Labour Resource

The estimated coefficients of the Logit model, along with the standard error and t-values are presented in Table 4.

The likelihood ratio test was -112.86 for male and -97.127 for female with 5 degree of freedom is significant at ( $p \leq 0.01$ ). This implies that all the

variables included in the Logit model are jointly significant in influencing farmers' access to labour resources. Therefore, the socioeconomic characteristics of farmers have a significant effect on access to labour resources. Table 4 shows that age, education, extension visit and credit are statistically significant determinants of access to labour resources.

The McFadden R-square of 0.62 and 0.46 for male and female rice farmers respectively, implies that 62 and 46 percent in the variability in accessibility to labour resource in the study area was explained by the explanatory variables (age, education, extension visit and credit) specified in the model. The F value of 37.218 and 34.289 were statistically significant at 1% probability level and this indicates the joint significance of the specified variables on gender accessibility to labour resource in the study area.

Age of the rice farmers were found to be positive and significantly influence access to labour resource at 5% level of significant for both male and female. This implies that increase in age to a certain extent would increase farmers' access to labour resource. Age has been found to determine how active and productive the head of the household would be. Age has also been found to affect the rate of household adoption of innovations, which in turn, affects household productivity and livelihood improvement strategies. Age was reported by [24] to be associated with accumulation of skills, more experience and accumulation of assets. This could enhance farmers' accessibility to labour resource.

**Table 4. Factors influencing gender accessibility to labour resource**

Variables	Male			Female		
	Coefficient	St. error	t-value	Coefficient	St. error	t-value
Constant	0.091	0.251	0.363	0.221	0.164	1.495
Age	0.594	0.261	2.276**	0.934	0.456	2.048**
Education	5.510	4.707	1.171	0.767	3.364	0.228
Household size	0.545	0.201	2.692***	0.984	0.485	2.029**
Extension visit	0.552	0.332	1.663*	0.366	0.214	1.710*
Membership of cooperative	-3.413	13.076	-0.538	0.999	12.275	0.081
Access to credit	0.541	0.324	1.669*	-0.578	0.497	-1.162
Numbers of observation	75			50		
Log likelihood ratio test	-112.86			-97.127		
McFadden R-square	0.62			0.46		
F- distribution	37.218***			34.289***		

\*\*\* =  $P < 0.01$ ; \*\* =  $P < 0.05$ ; \* =  $P < 0.010$

Household size was positive and significant at 1% and 5% level for male and female rice farmers respectively. This showed that household size influences farmers' accessibility to labour resource in rice production. The significance of household size in agriculture hinges on the availability of labour for farm production. As the number of people in a household increases, a pool of family labour becomes available for production processes and also the total area cultivated to different crop enterprises. This finding is in line with [25] who revealed that household size statistically influences productive resources and other household activities.

Extension contact was positive and significant at 10% level of significant for male and female farmers respectively. This indicates that accessibility to labour resource increases when farmers had more contact with extension agent. Availability of extension could play an important role on information dissemination which could lead to awareness of resource availability. According to [26], extension service is very essential to the improvement of farm productivity and efficiency among farmers.

Access to credit was found to be positive and significantly influence access to labour resource among male farmers at 10% level of significant. The implication of this is that increase in credit would increase male farmers' access to labour resource. Credit provides the farmer with a means of expanding and improving his farm. It also determines the ease with which he adopts

new practices and technologies in his enterprise. However credit was not significant among the female farmers.

#### 4. CONCLUSION

Based on the findings of this study, it suffice to note that gender accessibility to productive resources is important in attaining food security and realizing the poverty reduction strategies of African countries. Farmers in the study area have limited access to major productive resources, but the females were more constrained. Providing resources in an efficient and equitable manner appears to have potential for greatly improving the scope for future poverty reduction in Nigeria. Given the necessary resources and the same enabling environment as their male counterpart in farming activities, women farmers are equally efficient in the utilization of these resources to achieve higher productivity and also there is need for an aggressive approach to ensure that gender participation in agriculture is at an increasing rate.

#### 5. RECOMMENDATIONS

Since cooperative membership was a significantly influences accessibility to land resources, rice farmers should join cooperative societies, so as to be able to benefit from the government and non-governmental organization through increased credit access, input supply and farm advisory services. Women involvement in agriculture is on the increase compared to men and men are more energetic than women,



therefore, women should be given appropriate types of technology to cater for the labour intensive farm activities, good financial support and access to more farm land through appropriate land reforms.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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