

Gender Differences in Agricultural Productivity among Rice Farmers in Anambra State, Nigeria: *Drivers and Strategies for A Gender Responsive Agriculture*

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Abstract

Gender inequality in access to land and other farm inputs has been identified as one of the causes of the declining productivity in agriculture and this varies across farm enterprises and regions. We examined gender differences in rice productivity in Anambra state Nigeria and identified the drivers of gender gap. Descriptive statistics, Likert scale and multiple regression analysis were used to analyse the data collected. The result showed that most of the rice farmers were male, married, educated, and within the average age of 45 years. The average household size was 7 persons while they had an average of 11 years farming experience. Finding on their productivity showed mean farm sizes of 1.02has and 0.8ha for male and female farmers respectively while average outputs of 668kgs/ha and 585kgs/ha were harvested by the male and female farmers respectively. Farm size, household size, and quality of seed planted had positive effect on the output of rice while gender and marital status had negative effect. The women had difficulty accessing necessary inputs for rice production, especially land. The drivers of gender gap in rice productivity in the study area were access to land, input and labour. The study concluded that gender has a significant negative influence (against female farmers) on the output of rice in the area and rice production in the area was dominated by the male gender who had more access to major farm inputs than the female. The study recommended that for a gender responsive Agriculture, Government should review land ownership, and communities should give women access to communal land. Also, the rights of male and female farmers to trainings, education, financial support, farm inputs and labour should be critically addressed by the ministry of Agriculture and other stake holders.

Keywords

Rice, Gender differences, land, Productivity, farm inputs

1. Introduction

Agricultural productivity in many Sub-Saharan African countries has been reported low because farmers are small holders and [1] reported that it is lower for female farmers who make up 50% of the agricultural labour force in the region. Gender issues in Agriculture and economic development have received increased focus and this is based on the recognition that development outcomes can be adversely affected by differentiated societal positions of men and women in terms of resource allocation, opportunities and rights [2]. [3] explained that gender also focuses on the access to and

control over resources, division of labour, rights etc and not just determined by biological characteristics of either men or women. [4] had reported gender differences in agricultural productivity across Sub-Saharan African countries with the women having lower productivity. [5] also reported that despite the high proportion of women in Agriculture, the productivity of the female farmers was low compared to their male counterparts.

[6] noted that female farmers in Nigeria accounted for about 75% of the population but their productive capacity in the Agricultural sector was lower than their male counterparts and this impacted the overall productivity adversely [2]. In Nigeria, women are largely involved in the planting, weeding, harvesting, processing and trading of food crops while men carry out tedious tasks such as land clearing, ridge and mound making. This, however, depends on the type of crop and region. For instance, Yam farming is traditionally seen as that of the male gender while women are seen to contribute and play important roles in Rice (*Oriza sativa*) farming system in Nigeria [3, 7, 8]. [9] affirmed that women farmers had been the pillars of rice production among rice producing communities in Nigeria but this trend changes with time depending on changes in other factors such as labour supply, land availability and source of funds [9]. According to [10] rice production involves the use of resource inputs in the production of outputs. Land, labour, capital, seeds, fertilizer and management are the inputs used in rice production. Other different endowments (such as land rights and education), different levels of human strength, different access and adoption of technologies, factors of production (such as capital, labour and management) etc. also add to the efficiency of rice production. [11] affirmed the existence of gender differences in the productivity of rice farmers, and attributed these to the roles of women in the society and physical strength which is in favour of men. Rice production involves a lot of agricultural activities carried out by farmers and [3] reported that gender participation in cultivation of rice are clearly seen in the different stages of production from land clearing to harvesting, with a particular gender dominating each stage. In some areas, the women gender dominates while in some areas, the reverse is the case.

Over the past decades there has been growing recognition of the contributions that men and women make to Agricultural productivity around the world and the gender gap in access to different types of assets such as land which plays a fundamental role in agricultural production. Control over land and ownership of assets are critical components of well-being. Access to land is a basic requirement for farming, and control over land is synonymous with wealth, status and power in many areas. Women are consistently less likely to be owners of agricultural land in many regions and when they own or operate in agricultural land, they usually have smaller plots [12, 13]. Difference in the use of inputs such as fertilizer, improved seed, labour and access to resources influencing productivity such as education, trainings extension services and credit has been identified as one of the key reasons women farmers have lower productivity [1, 13].

Differences in agricultural productivity have also been attributed to crop choice. [14] pointed out that productivity varies from crop to crop. Male farmers are more productive in some crops while female farmers are more productive in others. [2] observed that male managed plots were more productive both in quantity harvested and harvest sales and this was more pronounced in cassava, yam and maize production. According to [5], cultural constraints, physical and human capital, farming experience in favour of men and labour market imperfection which is biased against women are other sources of gender productivity gaps in Agriculture.

Considering the noted challenges and gaps in agricultural productivity in Nigeria, rice production in particular; and the role of gender inequality in rice production, this study became relevant and specifically:

- 1) identified the socioeconomic characteristics of the rice farmers;
- 2) determined the output of rice/ha among male and female farmers;
- 3) evaluated the determinants of rice productivity;
- 4) enumerated the challenges faced by male and female farmers; and
- 5) assessed the extent of gender differences in acquisition farm inputs and the drivers of gender gap in rice productivity.

Male and female farmers have equal productive efficiency especially when inputs, market and credit access as well as physical and human capital are controlled. Accurate diagnosis of the drivers of gender gap is necessary to identify appropriate policy interventions for increasing women's agricultural productivity. This study is very necessary as it assessed existing gender issues among rice farmers and exposed the areas that need to be intervened upon. This will enable the relevant authorities to know where to intervene. The findings of this research reveal drivers of gender gap in rice productivity.

2. Materials and methods

This research was carried out in Awka North Local Government Area (L.G.A.) of Anambra State, South-East Nigeria. Anambra state is made up of four agricultural zones namely; Aguata, Anambra, Awka and Onitsha. Awka North is a Local Government Area in Awka agricultural zone of Anambra state. Agriculture is an important economic feature in Awka North L.G.A. with crops such as rice, yam, cassava and maize cultivated within the area. Two hundred rice far-

mers were selected for the study using both purposive and simple random sampling techniques.

2.1 Analytical Procedure

Data were analysed using descriptive statistics such as mean, mode, percentage, etc.; Likert scale and Multiple Regression analysis. The Socioeconomic characteristics of the farmers, Output of rice /ha and challenges faced by the farmers were determined with the use of descriptive statistics such as mean, mode, and percentage.

The determinants of the output of rice were evaluated with multiple regression analysis

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + \dots + b_{11}x_{11} + e_t \dots \dots \dots \text{eqn 1}$$

Y = output of rice (in bags)/ha

X₁ = Gender (female=1 : male=0)

X₂=farm size (Ha)

X₃= Age (years)

X₄= number of years in school

X₅= quantity of fertilizer applied

X₆= marital status (single=1 : married=0)

X₇= quality of seed planted (improved=1 : unimproved= 0)

X₈= number of extension visits

X₉= household size

X₁₀= access of credit (yes=1 : no=0)

X₁₁= farming experience.

The extent of gender differences in land acquisition and access to farm inputs was assessed with a 5-point Likert scale. This was indicated thus: Not accessible (1), Difficult to access (2), Not sure (3), accessible (4), Very Easy to access (5), (5+4+3+2+1 = 15/5= 3). The respondents were asked to choose how accessible land and farm inputs were to them. Any variable that was above 3 was considered accessible while any variable less than 3 was taken as not accessible.

3. Results and Discussion

3.1 Socio-economic characteristics of the respondents

The distribution of the respondents according to their socio-economic characteristics is displayed in Table 1. The result shows that male farmers constituted majority (54%) of the respondents, while the remaining 46% were female farmers. This finding is in line with the reports of [15] and [16] which showed that more male farmers than female farmers engaged in rice production. Their mean age was 45 years and this implies that the farmers were still within the active age range. It further shows that there is a future in rice production in the area since most (74%) of the farmers were 50 years and less. This finding on average age agrees with [16] but a bit lower than the 46 years reported by [17] and the 49 years reported by [15], in their various works on rice production. Most (86%) of the farmers had one form of formal education or the other, with majority (46%) of them attaining the secondary education level. The average number of years spent in acquiring formal education was 8 years (J.S.S 2). This supports the finding of [16] that the mean number of years spent in school by rice farmers was 8 years (that is J.S.S. 2). High literacy level of farmers will enhance dissemination of information very easy because it enables them to have a good understanding.

Most (68%) of rice farmers were married with an average household size of 7 persons. [16] had reported same average household size and noted that household size is of great importance in agricultural production because large sized family may be exploited for execution of labour activities. This indicates that an additional labour force is available during rice production. Their average years of experience in rice farming was 11.4 years and a majority (62%) of them were full time producers who carried out rice production on commercial scale (72% of the farmers). This implies that rice farming is a good source of livelihood since the respondents had it as their main job. The fact that 76% of the respondents were the heads of their households implies that majority of the respondents were bread winners who fed their homes from the proceeds of rice farming. The results displayed on Table 1 further showed that 49% of the respondents had no contact with extension agents. This is not encouraging and implies that such respondents get their information on farming practices from other sources or they do not get it at all.

3.2 Productivity of rice farmers in the study area

Findings on the productivity of the respondents are displayed in Table 2. The average farm size of the male respondents was 1.02ha while that of their female counterpart was 0.8ha which implies that men have more access to land than the women. [10] stated that men and women within the African rural household pursue their own activities both on and off the farm. They also have different endowments (such as land rights and education), different levels of human

strength, different access and adoption of technologies, factors of production etc. which add to the efficiency of production with the male farmers having turn over [18]. Table 2 also revealed that cost of rice seed sown per hectare was an average of N38,400 for men and N29,700 for women. The male respondents harvested an average of 668 kg/ha while the female counterpart made an average of 585 kg/ha. [19] in their work showed that the marginal product capital for the male farmers is N71.72 and N49.41 for female farmers, and this means the male farmers would produce more output than the female farmers because the male farmers have more capital than the female farmers. [19] reported similar finding. Selling price was revealed to be N550 per kilogram at the time of this study.

Table 1. Socio-economic characteristics of rice producers in the study area

VARIABLE	FREQUENCY	PERCENTAGE	MEAN/MODE
Sex			Male
Male	108	54	
Female	92	46	
Age(years)			44.7
21-30	20	10	
31-40	80	40	
41-50	48	24	
51-60	28	14	
61-70	12	6	
71 and above	12	6	
Education level (years)			8
0	28	14	
1-6	36	18	
6-12	92	46	
13-20	44	22	
Household Size			7
1-5	48	24	
6-10	104	52	
11-15	48	24	
Farm experience(years)			11.4
1-10	120	60	
11-20	40	20	
21-30	28	14	
31-40	12	6	
Marital status			Married
Married	136	68	
Others	64	32	
Mode of operation			Full time
Full Time	124	62	
Part Time	76	38	
Scale of operation			Commercial
Subsistence	56	28	
Commercial	144	72	
Head of household			Yes
Yes	152	76	
No	48	24	
Number of extension visits			0
0	98	49	
1	74	37	
> 1	28	14	

Source: field survey, 2022

Table 2. Productivity of rice farmers in the study area

	MALE FARMERS			FEMALE FARMERS		
	Frequency	Percentage	Mean/mode	Frequency	Percentage	Mean/mode
Farm size (ha)			1.02			0.8
<1	57	52.78		55	59.78	
1—2	51	47.22		37	40.22	
Quantity of rice sown/ ha (kg)			84kg			76kg
0-50	18	16.67		30	32.61	
51-100	62	57.41		53	57.61	
101-150	28	25.92		09	09.78	
Cost of rice sown/haN			38,400			29,700
1-25,000	18	16.67		30	32.61	
25,001-50,000	90	83.33		62	67.39	
Quantity of rice(kg)harvested/ha			668			585
< 501	36	33.33		41	44.57	
501-1000	67	62.04		49	53.26	
> 1000	05	04.63		02	02.17	
Selling price/kg (N)			550			550
0-600	108	100		92	100	

Source: field survey, 2022

3.3 Factors that determined rice productivity

Table 3 reveals that sex, farm size, Household size, quality of rice seed planted, and marital status significantly influenced the productivity of rice in the study area. However, while farm size, household size, and quality of seed planted had positive effect on productivity, the sex of the farmer and marital status had negative effect. This finding contradicts the conclusion of [10] that Labour, land and fertilizer are the significant contributors to higher output and yield in rice production. The sex of the farmer has a negative influence on rice productivity. This means that female farmers were less productive than their male counterparts (1 represented female farmers in the analysis). This agrees with the assertions of [4] as well as [5] that women have lower productivity. Marital status also had a negative effect on productivity of the farmers (1 represented single in the analysis). This implies that the married were more productive than the single. This could be attributed to the fact that the married have ready sources of labour and hence can expand their scale of production. Also, the married have more mouths to feed so every effort will be channeled towards good yield. Household size was significant and had a positive influence on rice productivity. This implied that the more the household size, the more the number of hands that support farmers during rice cultivation, that is increased labor tend to increase rice production [20]. Another implication of this is that cost of labour will reduce, since less of hired labour will be employed, thereby leading to reduction in total cost of production.

The coefficient of farm size was positive and significant. This showed that (all things being equal) cultivation of additional farmland or an increase in the farm size will increase productivity. This agreed with the finding of [21]. In addition, the quality of rice seed planted had a positive influence on rice productivity. This is expected because good quality seeds are known to be more viable and productive than poor quality seeds. If the quality of seeds planted is good, many seedlings will sprout and quantity of grains produced will likely increase.

3.4 Constraints to rice productivity

Table 4 reveals that the major constraints to rice production were High cost of transportation, Inadequate extension services, Inaccessibility to cheap farm input, Poor technical know-how, Lack of access to bank loan, Lack of storage facilities, Lack of innovation, Inadequate capital, High cost of labour, Pest and diseases, Inaccessible road, Climate change and Child birth which affected only female farmers.

The column for each gender shows that the male respondents had high cost of transportation as the highest constraint(4.67), followed by inadequate extension services (4.52), Inaccessibility to cheap farm input (4.05), Poor technical know-how (4.3), Lack of access to bank loan (3.67), Lack of storage facilities (3.56), Lack of innovation (3.33), Inadequate capital (3.05), High cost of labour (3.03), Pest and diseases (2.8), Inaccessible road (2.67), and Climate change (2.33). The female respondents however had inadequate extension services as the highest constraint with the mean score

of 4.67, followed by Poor technical know-how, inaccessible road, Inaccessibility to cheap farm input, high cost of transportation, Lack of storage facilities, Inadequate capital, Lack of access to bank loan, Lack of innovation, Pest and diseases, High cost of labour and Child birth. High cost of transportation, inaccessible roads, inadequate extension services and inaccessibility to cheap farm inputs were common constraints to both the male and female farmers. This agrees with [14] who had similar observation in their study.

Table 3. Regression analysis results of the determinants of rice productivity

Variables	Coefficient	SE	t-stat	p-value
Constant	12694.153	20841.296	.609	.546
Sex	-165.510	79.534	-2.081	.043**
Farm size	597.209	190.863	3.129	.003***
Age	-70.839	227.778	-.311	.758
Number of years in school	-32.200	26.656	-1.208	.233
Quantity of fertilizer applied	23.407	632.622	.037	.971
Marital status	-191.487	56.486	-3.390	.001***
Quality of rice seed planted	82.364	28.009	2.94	.008***
Number of extension visits	-658.350	559.346	-1.177	.245
Household size	64.048	21.23	3.017	.003***
Access to credit	753.366	709.857	1.061	.130
Years of farming experience	106.769	206.105	0.518	.459
R ²	.763			
Adjusted R ²	.688			
F-ratio	3.247***			

Note: ***, **, are statistically significant at 1%, and 5% respectively

Source: field survey, 2022

Table 4. Constraints to rice production

Constraints	Male		Female	
	Mean	Rank	Mean	Rank
High cost of transportation	4.67	1 st	4.29	5 th
Inadequate extension services	4.52	2 nd	4.86	1 st
Inaccessibility to cheap farm input	4.05	3 rd	4.73	4 th
Poor technical know-how	4.3	4 th	4.8	2 nd
Lack of access to bank loan	3.67	5 th	3.67	8 th
Lack of storage facilities	3.56	6 th	4.17	6 th
Lack of innovation	3.33	7 th	3.53	9 th
Inadequate capital	3.05	8 th	3.74	7 th
High cost of labour	3.03	9 th	3.07	11 th
Pest and diseases	2.8	10 th	3.33	10 th
Inaccessible road	2.67	11 th	4.74	3 rd
Climate change	2.33	12 th	3.01	13 th
Bird invasion	1.33	13 th	2.11	14 th
Child birth	1.23	14 th	3.03	12 th

Source: field survey, 2022

3.5 Accessibility to major farm inputs

Table 5 revealed that the male respondents had access to land (1st, 4.25), labour (2nd, 3.25) and fertilizers (3rd, 3.0). Land is easily inherited by the male farmers which make it readily available to them. Output is guaranteed when these inputs are readily available. These findings agree with [12, 13] who revealed that labour, land and fertilizer are significant contributors to higher output and yield, and that male labour input tends to promote higher rice output than that of their female counterparts. For the female respondents Table 5 shows that the female farmers had access to labour (1st, 3.5), and bank loan (2nd, 3.25). The other inputs were not accessible to the female farmers. Though both genders have access to labour, the female gender seems to have more access (mean score of 3.5 against 3.25). An explanation to this could be that the female farmers have more influence on the children thereby making them available as source of labour in the farm. This also implies that women have more access to loan than the male farmers because it is perceived that women needs it more. Generally, the results displayed on Table 5 shows that farmers' access to major inputs for rice production is very low.

Table 5. Access to major farm inputs

Variables	Male		Female	
	mean	Rank	Mean	Rank
Access to land	4.25	1 st	2.5	4 th
Financial support from friends	2.5	6 th	2.1	5 th
Access to fertilizers	3	3 rd	1.3	8 th
Access to farm inputs	1.75	7 th	1.5	7 th
Labour	3.25	2 nd	3.5	1 st
Access to bank loan	2.75	4 th	3.25	2 nd
Improved farm technology	2.7	5 th	2.7	3 rd
Extension agent	1.3	8 th	1.75	6 th

Source: field survey, 2022

4. Conclusion and Recommendations

4.1 Summary and Conclusion

The study concludes that: first, rice production in the area was engaged in by mostly married farmers who were full time rice farmers that operated on commercial basis, had an average of 8 years in school and 11 years farming experience; Second, the enterprise was dominated by the male gender who also had more access to land and other major farm inputs than the female gender, and hence, more productive. It is also revealed that women had difficulty accessing available inputs especially land for rice production. Third, there is a significant negative influence of gender on the output of rice in the area (output decreases for the female gender). Fourth, the farmers contended with numerous challenges which affected their productivity; and finally, drivers of gender gap in rice productivity in the study area are access to land, input and labour. We recommend that for a gender responsive agriculture, Government at all levels should make policy on gender equality in accessibility of these productivity drivers so as to increase women's agricultural productivity. Also, Farmers' cooperatives and women in Agriculture groups should make efforts towards assisting pregnant and nursing female farmers with labour because Child birth was identified as a constraint to the female farmers. We further recommend that financial institutions should make loans available and affordable to the rice farmers so as to increase their scale of production.

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