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## Women Access to Land: The Compatibility of Property Rights on the Farming Activities of Women in Rice Producing Areas of Osun State, Nigeria

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### ABSTRACT

This study explored property land regimes and other factors affecting the women rice farmers in the Osun State Nigeria. A multistage sampling procedure was used to collect primary data which were obtained from a cross-sectional survey of women rice farmers. Data were analyzed using descriptive statistics, stochastic frontier analysis, budgetary technique and returns to investment (ROI) analysis. The results showed that among the average age was 49.00 years, average household contained nine members; they had an average of 5.88 years of formal education and about 40.20% of the women owned less than 5 plots of land. The study concluded that: the level of investment in land and rice production were affected by pattern of land acquisition among the women; the women rice farmers were not efficient and that access to land is a major factors influencing their efficiency level; and that rice farming is a profitable investment among women farmers.

**Keywords:** Farming activities, property rights, women, rice production and technical efficiency.

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### INTRODUCTION

Agriculture is the mainstay of Nigerian economy, it accounts for over 70% of the active labour force and more than 23% of the Gross Domestic Product in Nigeria. Majority of rural poor invest in agriculture especially in the production of major food crops such as tubers (yams and cassava), legume (groundnut and cowpea), vegetables as well as cereals (sorghum, maize and rice) (World Bank, 2007). Rice is a major cereal crop grown in Nigeria and an important staple food for many households. Hundreds of millions of people spend more than half of their incomes on rice to feed their families. Rice farming is also a major source of employment especially for the poor and small-scale farmers who account for about four-fifths of the world's rice production (FAO, 2006). Nigeria economy grew from an agricultural base with rice being one of the food crops grown in the country. The substitution of rice for coarse grain, traditional roots and tubers has fuelled its demand at an annual rate of 5% per annum, induced by growth (Moses and Adebayo, 2007). The demand for rice is growing faster than any other staple food with its consumption broadening across all socio-economic classes (Fatoba *et al*, 2009).

According to FAO (2013), Nigeria imported about 3.4 million metric tonnes of rice between 2011 and 2012, making the country the world's largest rice importer. Although the domestic rice production stood at 3.1 million metric tonnes, domestic consumption rose to 5.0 million metric tonnes during this period. The differences (2.1 million metric tonnes) between the domestic supply and demand was provided for through importation at a huge amount of about ₦356 billion which was not only inappropriate but also clearly devastating to the country's economy. However, with the banning of rice importation coupled with, improved technologies, provision of high yielding varieties and other government fiscal policies, domestic rice production is expected to increase substantially (Ogundari, 2006).

Giving the current projection of 200 million population by the year 2020, there is need to encourage women farmers who play a vital roles in rice production, processing and marketing in Nigeria,

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accounting for about 60-80 percent of rice production in Nigeria (Rahman and Usman, 2004). A review of some studies have noted that women constitute the majority of smallholder farmers providing most of the labour and managing many farms on daily basis. Available evidence and statistics show that nowadays the role of women in agricultural production cannot be trivialized. Despite women contributions, women farmers still face daunting constraints to their productivity arising from limited access to productive resources especially land (Adeyemo, 1984; Ayoola *et al*, 2006; Rahman 2008; Ogunlela and Mukthar 2009).

Land remains an asset of great importance to African economies, as a source of income, food, employment and export earnings. The unique feature of land is its fixed nature and this has generated a lot of policies administration in its use rights and transfer (Akinola and Adeyemo, 2013). Effective control of land is critical to its sustainable use, the assumption is that farmer will invest in land and land improving technologies if their rights to such land are secured (Idowu, 2006). In Nigeria, however, the customary and formal tenure systems have marginalized women rights (whether as daughters, sisters, wives and mothers) who now tend to have subordinate roles in relation to land. Women farmers are forced to determine and derive their livelihood while operating within the customary tenure systems which are patriarchal and biased against them (Adedipe *et al*, 1997; Fenske, 2010). In Osun state, women farmers cultivate upland rice and are as effective as their male counterpart but their total productivity is far from optimal and record about 66% less yield annually because of insecure land right and poor control of productive resources (Ogunleye *et.al*, 2015). This often leads to gross inefficiency in the use of land and other productive resources. The question of women access to land for agricultural purposes is of great importance if they are to benefit from the technologies such as irrigation, processing techniques, subsidized farm supply, credit and extension services which are designed to increase national output of rice (Umeh and Chukwu, 2013, Bhaumik *et al*, 2014). Empirical evidence to support this argument especially in the Southwestern Nigeria is very rare. Therefore, given this background, it is imperative to empirically investigate the following among the women rice farmers in the study area: explore property land regimes; determine the efficiency of using land and other resources and determine the profitability of rice production in the study area.

## **METHODOLOGY**

### **Area of study**

The study was conducted in Osun State where rice production is appreciable. The state is located in South-western Nigeria. The state covers a total land area of approximately 860 square kilometers. The study area is characterized by two peak rainfall regimes with a short August break which is considered beneficial to rice production. The average rainfall ranges from 1125mm to 1475mm. The state consists of three agro-ecological zones, rain forest, derived savannah and savannah zones. The farmers in the state grow cash crops as well as arable crops and rice is one of the most important arable crops grown in the state.

### **Data collection and sampling techniques**

The data used for this study were primary data which were obtained from a cross-sectional survey of women rice farmers in the selected areas of the state. Questionnaire was developed with check lists to elicit in-depth information from women rice farmers which included farming experience, marital status, education, access to land technologies available and other vital information. A multistage sampling procedure was used to collect the data. The first stage involved the purposive selection of Local Government Area (LGA) based on priority knowledge that the LGA is a rice producing area. The second stage involved a simple random selection of five communities from the LGA. The last stage involved the use of proportionate random selection of women rice farmers from each community to make a total of 102 farmers for this study.

### **Data analytical techniques**

#### **Descriptive statistics**

Descriptive statistics was used to describe the socioeconomic characteristics, various land regimes and land acquisition patterns among women farmers in the study area using frequency counts, percentages, means and standard deviations.

**Stochastic frontier analysis (SFA):**

Stochastic frontier analysis (SFA): A stochastic production function was used to determine the efficiency of land and other production resources of the women rice farmers.

We adopted a variant of the stochastic frontier production function proposed by Battese and Coelli (1995) which builds hypothesized efficiency determinants into inefficiency error component so that it will be easy to identify focal points for action to bring efficiency to higher levels among women rice farmers in the study area.

The general form of the model is as expressed in equation (i):

$$Q_i = \beta_0 + \beta_1 X_i + (V_i - U_i) \dots\dots\dots (i)$$

The Double Log equation is given as:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + V_1 - U_1 \dots\dots\dots (ii)$$

Where:

ln = Natural Logarithm.

$Y_i$  = Value of Farm Output (₦/ha).

$X_1$  = Farm Size (ha).

$X_2$  = Labour (personday)

$X_3$  = Total Cost of Production (₦/ha)

$\beta_0$  = Intercept.

$\beta_1 - \beta_3$  = Parameters to be estimated.

$V_1$  = Random error which accounted for the random variations in output value by factors which are beyond the control of the farm such as disease outbreak, weather, measurement errors, e.t.c., and it is assumed to be independently and identically distributed ( $V_1 \sim [0, 1]$ ) independent of  $U_i$

$U_i$  = Non-negative variable associated with technical inefficiency in production and it is assumed to be independently and identically distributed as half normal, ( $U_i \sim [0, 1]$ ).  $U_i = TE$ .

In order to determine the factors that contributed directly to technical inefficiency, equation (ii) was estimated and jointly used with the stochastic models (Coelli, 1996).

$$TE = \alpha_0 + \alpha_1 Z_1 + \alpha_2 Z_2 + \alpha_3 Z_3 + \alpha_4 Z_4 + \alpha_5 Z_5 \dots\dots\dots (iii)$$

$Z_1$  = Age (years).

$Z_2$  = Households Size (#).

$Z_3$  = Education (years).

$Z_4$  = Farming Experience (years).

$Z_5$  = Access to Land (1= yes; 0= no).

$\alpha_0$  = Intercept

$\alpha_1 - \alpha_5$  = parameters to be estimated

**Budgeting technique**

Budgeting technique was used to determine the costs and returns rice production among the women farmers. Information provided on the analysis include: total cost (TC) comprising total fixed cost (TFC) and total variable cost (TVC) and total revenue (TR) which is the product of output quantity (Q) and unit price (P). These are stated as follows:

$$TC = TFC + TVC \dots\dots\dots (iv)$$

$$TR = P \times Q \dots\dots\dots (v)$$

The gross margin (GM) was computed as in equations (vi) and (vii):

$$GM = TR - TVC \dots\dots\dots (vi)$$

**Return on Investment (ROI)**

Rate of returns on investment was calculated as total profit/GM divided by to costs.

$$ROI = (\text{Total GM}) / (\text{Total Costs of Investment}) \dots\dots\dots (vii)$$

This was used to determine the profit/GM per naira invested by women rice farmers.

**RESULTS AND DISCUSSION**

**Socioeconomic characteristics of women rice farmers**

The socioeconomic characteristics of the women rice farmers in the study area were presented in table 1 of the appendix, the result showed that the average age was 49.00 years, while the minimum and maximum age were 23.00 and 75.00 years respectively. The age distribution further showed that 72.50% of the women farmers were below the age of 50 years. This implies that the most of the women were still active and were within their productive age. The result also indicated that all the women farmers were married with the mean year of married being 21.00. About 77.40% of them have been married for less than 40.00 years. They were probably within the child bearing and nursing stages. The result further revealed that 50.00% of the women were native of the community and that 70.6% of them have been living in that community for more than 5.00 years. This implied that the women farmers would have better access to farm land and other productive resources by virtue of their interaction within the study area. This should contribute positively to rice production and the level of efficiency among the women farmers. Household size distributions showed that an average household in the study area consisted of 9.00 members, and that 67.60% of the households were made up of more than 5 members with some having as much as 19.00 members. The minimum households consist of 2.00 members.

**Table1. Socioeconomic characteristics of the women rice farmers.**

<b>Age (Years)</b>	<b>Frequency</b>	<b>Percentage</b>
<20	19	18.6
21-30	13	12.7
31-40	17	16.7
41-50	25	24.5
51-60	28	27.5
Total	102.00	100.00
Mean	48.63	
Std. Deviation	14.38	
Minimum	23.00	
Maximum	75.00	
<b>Years of Marriage</b>	<b>Frequency</b>	<b>Percentage</b>
<10	24	23.5
11-20	26	25.5
21-30	29	28.4
31-40	18	17.6
>41	5	4.9
Total	102	100.0
Mean	21.33	
Std. Deviation	12.84	
Minimum	1.00	
Maximum	57.00	
<b>Household Size</b>	<b>Frequency</b>	<b>Percentage</b>
<5	33	32.4
6-10	46	45.1
11-15	14	13.7
>16	9	8.8
Total	102	100.0
Mean	8.10	
Std Deviation	4.28	
Minimum	2.00	
Maximum	19.00	
<b>Years of Formal Education</b>	<b>Frequency</b>	<b>Percentage</b>

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<5	40	39.2
6-10	33	32.4
11-15	28	27.5
>16	1	1.0
Total	102	100.0
Mean	5.88	
Std. Deviation	4.98	
Minimum	0.00	
Maximum	17.00	
<b>Membership of Social Organization</b>	<b>Frequency</b>	<b>Percentage</b>
None	67	65.7
Crop Society	8	7.8
Esusu	2	2.0
Farmers' Union	14	13.7
Others	11	10.8
Total	102	100.0
<b>Sources of Fund</b>	<b>Frequency</b>	<b>Percentage</b>
Self	5	4.9
Friends	21	20.6
Money Lender	48	47.1
Others	28	27.5
Total	102	100.0

Source, data survey, 2014

This has a lot of implications on the labour availability, and the household financial status. The years of formal education reveal an average of 5.88 years among the women farmers, with the maximum years of formal education being 17.00. About 60.90% of the women had more than 6.00 years of formal education. This implied that the women farmers were highly educated and would be able to analyze, accept and adopt improved production technologies for efficient production. Distribution by membership of association revealed that only 34.30% of the women rice farmers are members of functional groups/associations. This has a lot of implication on their access to social and financial capital. Only 4.90% of them were able to finance their farming activities themselves while the other 95.10% had to depend on other sources for finances. About 57.00% had access to extension workers and more than 99.90% of them claimed that their rice production activities were constrained by environmental problems such as predators, soil erosion and soil fertility depletion. These would have serious implication on the efficiency as well as the profitability of rice farming among the women farmers.

### Property Land Regimes among the Women Rice Farmers

The property land regime of the respondents is shown in table 2. Farming experience among the women showed that the mean year of 23.41, with the minimum and maximum being 1.00 and 55.00 years respectively. About 87.30% of them have being farming for more than 10 years. This would have positive influence on the productivity and hence their level of efficiency. However, it could also imply that they have being farming consistently on a particular parcel of land if they had limited access to more than one farm land. This would impact negatively on their productivity and efficiency. The average value showed that women owned less than one plot in the area. About 40.20% of the women owned less than 5 plots of land. The size of the plot was 3.72 ha on the average, and about 41.20% of them had access to less than 5ha in the study area. The average size of land used for rice farming was 2.22ha and more than 42.00% of the women used less than 5.00ha for rice farming. This implied that majority of the women rice farmers were smallholders. Over 64.00% of them practiced mixed cropping system. This would impact negatively on their level of rice output.

**Table2.** Property land regimes among women rice farmers.

Farming Experience	Frequency	Percentage
<5	3	2.9
6-10	9	8.8

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11-15	15	14.7
16-20	29	28.4
21-25	11	10.8
26-30	17	16.7
31-35	3	2.9
35-40	9	8.8
>41	6	5.9
Total	102	100.0
Mean	23.41	
Std Deviation	10.62	
Minimum	1.00	
Maximum	55.00	
<b>Number of Plot Owned</b>	<b>Frequency</b>	<b>Percentage</b>
<5	41	40.2
6-10	46	45.1
11-15	12	11.8
>16	3	2.9
Total	102	100.0
Mean	0.77	
Std Deviation	0.76	
Minimum	0.00	
Maximum	3.00	
<b>Size of the Rice Farms</b>	<b>Frequency</b>	<b>Percentage</b>
<5	42	41.2
6-10	43	42.2
11-15	13	12.7
>16	4	3.9
Total	102	100.0
Mean	3.66	
Std Deviation	2.22	
Minimum	1.00	
Maximum	10.00	

Source, data survey, 2014

**Land Acquisition Pattern among the Women farmers.**

Land acquisition pattern among the women rice farmers in the study area is shown in table 3 of the appendix. The results showed that 49.00% of the women do not have ownership right to the land they used for rice farming, the mode of land acquisition range from inherited (45.10%), borrowed (22.50%), leaseholds (28.40%) and purchased (2.90%). About 31.40% of the women did not have security over the land and this would affect their level of investment in terms of land improvement techniques, among others. More than 40.00% of the women claimed that the land security status actually influenced the investment decision. This result corroborated the findings of Idowu (2006) and Tenae *et al* (2009). The results also indicated that 12.7% of the women did not practice any form of land conservation techniques while over 45.00% used inorganic fertilizer. More than 45.00 % of the women rice farmers had less than 5.00 years of fallow periods. This would not only have implications on the productivity of the farm land due to consistent use but also on their financial status.

**Table 3.** Land acquisition pattern among women rice farmers.

<b>Land Ownership</b>	<b>Frequency</b>	<b>Percentage</b>
No	50	49.0
Yes	52	51.0
Total	102	100.0
<b>Mode of Land Acquisition</b>	<b>Frequency</b>	<b>Percentage</b>
Inherited	46	45.1
Purchased	3	2.9
Borrowed	23	22.5
Leasehold	29	28.4

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Others	1	1.0
Total	102	100.0
<b>Land Security</b>	<b>Frequency</b>	<b>Percentage</b>
Secured	70	68.6
Not-secured	32	31.4
Total	102	100.0
<b>Does Land Security affect your Investment Decisions?</b>	<b>Frequency</b>	<b>Percentage</b>
No	61	59.8
Yes	41	40.2
Total	102	100.0
<b>Can you Rent out your Land?</b>	<b>Frequency</b>	<b>Percentage</b>
No	62	60.8
Yes	40	39.2
Total	102	100.0
<b>Land Conservation Practiced</b>	<b>Frequency</b>	<b>Percentage</b>
None	13	12.7
Mulching	1	1.0
Inorganic fertilizer	46	45.1
Bush fallow	42	41.2
Total	102	100.0
<b>Fallow Duration</b>	<b>Frequency</b>	<b>Percentage</b>
<5	46	45.1
6-10	10	9.8
11-15	17	16.7
16-20	10	9.8
>21	19	18.6
Total	102	100.0

Source, data survey: 2014.

### Technical Efficiency of Land use and other Resources

The maximum likelihood estimates (MLE) of the parametric stochastic frontier analysis (SFA) were shown in table 4. Land and cost of production were positively related to the value of rice produced among the women farmers while labour is negatively related. This implies that the value of rice produced by the women farmers increase with an increase in total cost and size of farm land used, while the value of rice produced decreases with increase in labour input. The possible reason for this could be traced to the law of diminishing returns to labour input. All the independents variables were not significant level and the average technical efficiency score among the women farmers was 69.30%. This implied that women rice farmers in the area were operating below the production frontier; they can still increase their efficiency level by 30.70%. The inefficiency factors considered were age, households' size, years of formal education, farming experience and access to land. Among the inefficiency factors considered, access to land was significant while other factors were not. The results further showed that age, households' size and years of formal education were negatively related to the efficiency of resource use, while farming experience and access to land were positively related to it. The gamma diagnostics further confirmed that 98.80% of the inefficiency observed among the women rice farmers was as result of the inefficiency factors considered. Thus an improvement in any of the these inefficiency factors particularly the level of access to farm land would lead to significant improvement in the level of efficiency among the women rice farmers.

**Table4.** Technical Efficiency of Land use other Resources among Women Rice Farmers

Variables	Parameters	Coefficients	Standard Error
Constant	$\beta_0$	11.486*	0.171
$\ln X_1$	$\beta_1$	0.443	0.599
$\ln X_2$	$\beta_2$	-0.002	0.017

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$\ln X_3$	$\beta_3$	0.027	0.021
<b>Inefficiency factors</b>			
Intercept	$\alpha_0$	-9.265	6.733
Age	$\alpha_1$	-0.076	0.051
Household size	$\alpha_2$	-0.183	0.151
Education	$\alpha_3$	-0.219	0.168
Farming experience	$\alpha_4$	0.250	0.169
Access to land	$\alpha_5$	1.162	0.802
<b>Diagnosis statistics</b>			
Sigma-square $\sigma^2 = \sigma_u^2 + \sigma_v^2$		0.445	2.587
Gamma		0.988	0.009
LR		<b>34.368</b>	
Average TE		<b>0.693</b>	

Source, data survey, 2014.\* Shows that statistically significant at 5% level.

### Profitability of rice production among women farmers

Profitability of rice production among the women rice farmers were analyzed using the costs and returns to production of budgetary analysis and the rate of returns to investment (ROI).

The results of cost and return to rice production among the women farmers were presented in table 5. All the inputs used in production were taken into consideration for the gross margin analysis. The result revealed that the mean yield was 1641.84 kilogram per hectare (kg/ha) of rice, the average price per bag (1bag of rice = 50kg of rice) was ₦9,338.24 and the average quantity of rice sold (in bags) was 19.97. The mean total variable cost(TVC) per hectare of the women farmers was ₦43,053.00 and the mean total revenue (TR) was ₦149,877.45 per hectare. This invariably gave an average gross margin of ₦192,018.00per hectare among the women rice farmers. The result of rate of return on investment in table 5 of the appendix showed that rice farming was generally profitable among the women farmers in the area. The ROI of 4.86implied that for every ₦1.00 invested per hectare of rice production would yield ₦4.86 per hectare.

**Table 5.** Costs and returns to rice production among women farmers

Items	Women farmers (n=102)
(i) Mean yield (kg/ha)	1641.84 (142.22)
(ii) Price per bag (₦/bag)	9338.24 (8116.47)
(iii) Quantity of rice sold (Bags)	19.67 (9.57)
(iv) Total revenue	149877.45 (76104.29)
(vi) Total Variable Cost (₦/ha)	43053.00 (25526.64)
(vii) Gross Margin (₦/ha)	192018.00 (87206.37)
(viii) Return on Investment (ROI) (₦/ha)	4.86 (1.95)

Source, data survey, 2014

## CONCLUSIONS AND POLICY IMPLICATIONS

This study investigated the following among the women rice farmers in the Osun State Nigeria: explore property land regimes; determine the efficiency of using land and determine the profitability of rice production. The study was conducted in Osun State where rice production is appreciable. The state is located in South-western Nigeria. A multistage sampling procedure was used to collect primary data which were obtained from a cross-sectional survey of women rice farmers in the selected areas of the state. Questionnaire was developed with check lists to elicit in-depth information from women rice farmers. Information sought included farming experience, marital status, education, land, regimes access to land, costs and returns to rice production in the area. Data obtained were analyzed using descriptive statistics, stochastic frontier analysis, budgetary technique and returns to investment analysis. The results showed that the average age was 49.00 years, they were all married, an average household consisted of 9.00 members, the women had an average of 5.88 years of formal education and about 40.20% of the women owned less than 5 plots of land. The study concluded that: majority of the women rice farmers were smallholders; the level of investment in land and rice production were affected by pattern of land acquisition among the women in the study area; the women rice farmers



were not efficient and that access to land is a major factors influencing the level of efficiency in the study area; and that rice farming is a very profitable investment among women farmers in the study area. Thus an improvement in any of the these inefficiency factors particularly the level of access to farm land would lead to significant improvement in the level of efficiency among the women rice farmers.

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