

## Effects of Rural Land Tenure on Rice Productivity in Female-Headed Households in Enugu State, Nigeria

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### Abstract

The study was conducted in Enugu State in eastern part of Nigeria. The objectives were to: determine the socio-economic characteristics of female-headed rice producing households; investigate land tenure systems under which households cultivate rice, and determine the effects of land tenure on rice productivity. A 3-stage random sampling procedure was used to select One Hundred and Twenty respondents in three Local Government Areas which were chosen purposively due to wide spread cultivation of rice in the areas. Data collected via validated structured questionnaire were analysed using descriptive statistics such as means and percentages to summarise the socio-economic characteristics of the respondents, and land tenure systems. Ordinary Least Squares regression technique was used to determine the effects of land tenure system on rice productivity. Results show that majority (46.7%) of female heads of households were aged between 41 and 54 years with a mean of 50. Average years of farm experience, and formal education of the respondents were respectively 8, and 6. About 42%, 25%, 16%, and 41% of the households accessed farmland through communal, State, Purchase, and leasehold respectively. Socio-economic, and land tenure factors jointly had significant ( $F=42.227$ ,  $P < 0.01$ ) influence on rice productivity. The productivities were higher on public lands than privately, and communally accessed and cultivated lands. Communal land tenure practice had significantly ( $P < 0.05$ ) negative effects on productivity. Productivity gains of about 1.31% were observed under public land tenure systems, whereas 3.54% and 3.44% losses in rice productivity were found respectively under communal, and private land tenure arrangements per hectare. There is need to review Nigeria's land Tenure Act 1978 to offer unrestricted, adequate land access to small farmers.

**Keywords:** Rural Land Tenure, Enugu State, Productivity, Female-headed Households

### 1. Introduction

The foods sector of Nigeria agricultural economy comprises a wide range of food crops among which rice is a major staple (Akinbode, Dipeolu & Ayinde 2011; Kudi, Yakubu & Nasa 2010; Ayoola, Dangbegnon, Daudu, Mando, Kudi, Amapu, Adeogun & Ezui, 2011). Rice is grown in almost all the agro-ecological zones of Nigeria from the forests belt to the savannahs in the dry north. This is due, mainly, to the advantages of the commodity over other staple crops. According to Erhabor & Ojogho, (2011), the popularity of rice commodity in Nigeria's rural households is due to its ease of digestion; even people who are allergic to lots of other foods may eat rice. It has some quantity of amino acids and also provides minerals, vitamins and fibre when eaten.

Even though both demand, and local production of rice have been on the increase, in Nigeria, domestic production currently lags its demand (Oyakhilomen, Damisa, & Rekhot 2014; Kudi et al, 2010; Erhabor & Ojogho 2011). Using a growth model, Oyakhilomen *et al* (2014) showed for example, a compounded rice demand growth rate of 7.8% and local production growth of 6.7% between 1970 and 2011 clearly indicating higher demand rate of 1.1% over local supply. This is in spite of implementation of the National Special Programme on Foods Security and the Presidential Initiative on Rice which targeted 3 million hectares cultivation and 15 million tons of paddy rice (FMAWR, 2008). Consequently, Nigeria is still one of the largest importer of rice with 1 million metric tons of imported rice per annum (Kudi *et al* 2010), amounting to import bill of over \$ 300 million annually.

The need to close rice demand- supply gap has led scholars to throw search lights on gender issues in rice production. According to Umeh & Chukwu, (2014) female farmers play key roles in achieving food security but unfortunately, face limited access to land resources due to different socio-economic and land tenure factors.

Land tenure is essentially, the methods by which individuals or groups acquire, hold, transfer or transmit property rights in land (Ogolla & Mugabe, 1996). Three types of land tenure are practiced in eastern Nigeria: Public, Communal, and Individual (Arua & Okorji 1997). Individual tenures offer absolute proprietary rights including usufructuary, and alienation (Okowa & Nwangi, 1996), while communal tenure bestow interest

in land to the entire community and members possess use but not rights of alienation (FMARD 2008). Under State tenure, land is subject to control by government which serves public interest. These land tenure systems bear relationship with crop outputs.

Place & Hazel (1993) provide a good insight into the link between land ownership security and agricultural productivity drawing from the Neoclassical (1980) property right theory which was strengthened by the work of Feder (1988). The theory postulates that land tenure and natural resources underpin land-based livelihood activities of rural people including subsistence and cash crop farming. Feder (1987) stated that in order to increase productivity, a farmer must invest in equipment, infrastructure and land conservation measures; land ownership security increases the probability that benefits will be derived from investments made to improve farm productivity which in-turn serves as incentive for further longer term investments.

In Enugu State, however, there are functional land tenure systems in which rights to cultivable land resources are allocated by the lineage authority to male relatives, particularly, under customary land tenure system. Land scarcity and landlessness is, therefore, common among women rice farmers who, consequently, plant smaller plots compare to male farmers (Henri\_Ukoha, Korie, Ibekwe, Chidiebere-Mark, Ejike & Okparadim 2014). Earlier, Eze (1993) observed that in Enugu State, limited security of tenures has led to low productivity of rice cultivated by female farmers relative to that on male rice fields.

Furthermore, land tenure systems have been confronted with problems of rapidly growing population and competing economic uses of agricultural land. This has resulted to reduced land to man ratio, reduced fallow length and increased land use intensification. Consequently, farm yields and incomes have declined. This has raised concerns among stakeholders. Onoja & Unaeze (2008) studied the determinants of productivity and income of rice farmers in Enugu state, finding that size of land cultivated to rice, and years of formal education of farmers were significantly related to output. Also, Onyenekwe & Okorji (2015) investigating the constraints faced by farmer in rice production in Enugu state, mentioned land tenure as a problem. However, these studies were not focused specifically on female-headed rural households, and none provided quantitative estimates of productivity effects of public, communal, and private land tenure systems. This study investigated the productivity effects of rural land tenure systems among female-headed households in Enugu State. The specific objectives were to: determine the socio-economic characteristics of female heads of households; identify land tenure systems through which farm lands are accessed, and determine the productivity effects of the land tenure systems. It was hypothesized that:

- i socio-economic characteristics and land tenure systems have no significant influence on the productivity of rice in Enugu State
- ii private (individual) land tenure system has no significant effect on rice productivity in the Enugu State.
- iii there is no significant relationship between communal land tenure and rice productivity

## 2. Materials and Methods

The study was conducted in Enugu State in southeastern Nigeria. The State is located between longitude 6° 53'E and 7° 55'E of the Greenwich Meridian, and latitude 5°56'N and 7° 06'N of the Equator (Ezike 1998; Anyadike 2002), occupying a land area of about 8, 022.95 square kilometers, with a population of 3,257, 298 million persons out of which 1,633,096 are female (NBS 2007; NPC 2006). Enugu State is bounded to the north by Kogi and Benue States; to the south by Abia State, and to the east and west, respectively, by Ebonyi, and Anambara States. The state has a humid tropical climate with two distinct seasons with a characteristic bimodal distribution of rainfall which peaks during the months of July and September. The mean annual rainfall ranges from 1600 to 2000mm (Inyang, 1975).

Temperatures are uniformly high throughout the year (Asadu 1990), but rarely go higher than 21 °C except during harmattan (December through January); the annual mean maximum temperatures do not exceed 35 °C (Nnaji, Asadu, & Mbagwu 2002). The soils are sandy loam. The area which is derived savannah ecology with natural forest supports a wide range of crops such as yam, cassava, rice, maize, melon, vegetables, cocoyam, groundnut, sweet potato, and cowpea (NERLS & PCU 2006).

Sampling for the study was done using both purposive and multistage methods. First, one (1) local government area was selected from each of the three (3) agricultural zones that make up the entire state. These were: Aminri Local government in western zone; Ezeagu, in the eastern agricultural zone, and Uzo-Uwani, in northern agricultural zone. The selection of these Local governments was due to predominance of rice fields in the areas. In the second stage, two (2) communities were also purposively sampled from each local government selected, again based on wide spread cultivation of rice within the communities. The communities were: Mpu and Oduma in Aninri Local Government area; Agba-Umana, and Oloo both in Ezeagu Local government area, and Adani, and Iga, in Uzo-Uwani local government area. This gave a total of six (6) rice farming communities. In the third stage, twenty (20) female-headed rice producing rural households were randomly chosen from a list of rice growers obtained from Enugu State Agricultural Development Programme. The analyses were therefore, based on a random sample of size one hundred and twenty (120) respectively.

Primary data from female-headed rice producing households were collected using validated, structures questionnaire. The instrument of data collection elicited information on socio-economic characteristics of respondents such as age, income, rice cultivation experience as well as input-output, information and land tenure systems adopted. Data were gathered over a period of six (6) Months extending from January to July 2014.

Data derived from the questionnaire were coded and analysed using STATA12 and Statistical Package for Social Sciences (SPSS 16). Descriptive statistics including Means and Percentage were employed to achieve the first and second objectives of the study. Ordinary Least Squares regression model was applied to estimate productivity effects of rural land tenure systems. Hypothesis (i) was test using F-statistic; T-test was used in testing hypotheses (ii) & (iii). Production technology for female-headed rice producing households was specified as:

$$Q_i = Q(X_i, Z_i, \mu_i) \dots\dots\dots (1)$$

Both exponential and linear functional forms of equation (1) as specified in equations (2) and (3) were estimated.

$$\ln(Q_i) = \alpha + \beta X_1 + \delta X_2 + \phi X_3 + \sum_{i=1}^7 \gamma_i Z_i + \mu_i \dots\dots\dots (2)$$

$$Q_i = \alpha + \beta X_1 + \delta X_2 + \phi X_3 + \sum_{i=1}^7 \gamma_i Z_i + \mu_i \dots\dots\dots (3)$$

Where

$\ln$  = natural logarithm

$\alpha, \beta, \delta, \phi, \gamma$  are regression parameters to be estimated

$Q_i$  = Productivity of rice for the  $i$ th farmer in kg/ha

$X_i$  = land tenure type ( $i = 1, 2, 3$ ) such that

$X_1$  = government land tenure indicator (1/0 dummy)

$X_2$  = communal land tenure indicator (1./0 dummy)

$X_3$  = Private land tenure indicator (1/0 dummy)

$Z_i$  = vector of socio-economic variables ( $i=1,2, \dots, 7$ ) such that

$Z_1$  = Age of farmer (years)

$Z_2$  = Level of education (years)

$Z_3$  = rice production experience (years)

$Z_4$  = farm income (naira)

$Z_5$  = quantity of labour used (mandays)

$Z_6$  = quantity of fertilizer applied (kg/ha)

$Z_7$  = quantity of rice seeds planted (kg/ha)

Given the specifications of equations (2 & 3) the percentage effects of a land tenure practice on productivities were evaluated according to the procedure described by Gujarati & Porter (2012).

### 3. Results and Discussion.

This section highlights the findings of our research study, indicating land tenure issues in sustainable land use among female-heads of households.

#### 3.1 Socio-economic characteristics of female headed rural households.

Socio-economic characteristics of respondents are reported in Table 1. The women rice farmers cultivated about 1.36 hectares on average, with majority (65.8%) cultivating between 0.5 and 1.99 hectares. This is too uneconomic holdings for mechanization and economics of scale to occur. Around 68% of the respondents had cultivated rice for about 25 years indicating that female farmers were adequately experienced rice producers in the area.

Table1 Summary statistics of socio-economic characteristics of households.

Characteristics	Frequency	%	Mean
Age (years)			
27- 40	23	19.2	49.51
41-54	41	34.2	
Level of education (years)			
0-4	52	43.3	
5-9	36	30.0	5.75
10-14	17	14.2	
> 14	14	11.7	
Farming experience (years)			
1-12	44	36.7	
13-25	37	30.8	
26-38	20	16.7	7.6
39-51	18	15	
>-51	1	0.8	
Annual Farm income(Naira)			
50,000- 200,000	55	45.8	
200001-350001	35	29.2	288,730
350,002-500,002	17	14.2	
500,003-650,003	8	6.7	
>650,003	5	4.2	
Marital status			
Single	25	20.8	
Married	95	79.2	
Farm size (ha)			
< 0.5	14	11.7	
0.5-1.99	79	65.8	1.36
2.0-3.49	24	20	
> 3.49	3	2.5	

Source: field survey 2014.

### 3.2 Land tenure systems

In literature, the concepts of HMS were associated with a myriad of technical measures. McFarlane (1995) Findings indicated that about 42, 25, 16 and 41 percents of the respondents secure access to farm land through communal, State, purchase and leasehold respectively (table2). Land forms in Nigeria (land use ACT 1978) appeared to impact minimally both in terms of farmer access to farmland, and size of holdings ( $X=1.68$  hectares) operated by an average rice grower, under public land tenure system.

The households maintained less than a hectare of rice under communal and private tenures types probably due to fragmentation of farm lands characteristic of traditional inheritance systems, and high cost of leaseholds and outright purchase which are typical in private land markets in eastern Nigeria.

Table2 Land tenure systems and land access

Tenure Type	Frequency	Percentage %	Mean Area(hectare) Accessed (ha)
Communal	50	41.7	0.79
Government (public)	30	25.0	1.68
Purchase	19	15.8	0.67
Rent/ leasehold	49	40.8	0.69

Source: field survey 2014.

These findings were consistent with those of Bamire & Bamire (2010) who found that 84% of farmers in the savannas of Nigeria gain access to land mainly through inheritance cultivating less than 2 hectares in the region

### 3.3 Productivity Effects of Land Tenure Systems.

Land tenure productivity effects discussed here pertains to the estimates from exponential model which displayed higher R-squared and lower standard error of model.

Table 3: Summary of regression results of the effects of Land tenure on rice productivity.

Predictor	Linear model			Exponential model		
	coefficient	T-value	P-value	coefficient	T-value	P-value
Constant	2076.39	3.961***	0.00	6.456	36.48***	0.00
Years spent in school	0.059	0.61	0.54	0.006	0.090	0.93
Age	0.056	0.475	0.636	0.06	0.792	0.430
Farm experience	0.037	0.312	0.756	-0.066	-0.870	0.386
Farm income	0.131	1.800**	0.075	0.100	2.131**	0.035
Quantity of seeds planted	0.511	2.681***	0.008	0.202	1.638	0.104
Labour(Man-days)	-0.064	-0.685	0.495	0.588	9.683***	0.00
Quantity of fertilizer	0.479	2.468**	0.015	0.188	1.502	0.136
Communal tenure(dummy)	0.038	0.521	0.604	-0.047	-0.990**	0.032
State tenure(dummy)	-0.637	-6.300	0.00	0.013	0.204***	0.008
Individual tenure(dummy)	0.056	0.713	0.477	-0.035	0.693**	0.04
Diagnostic Statistics						
R-squared	0.509			0.795		
Adjusted R-squared	0.464			0.776		
Standard error of model	811.49			0.274		
Sum of squared residual	7.18E7			8.180		
F-statistic	11.28			42.23		
Probability of F-statistic	0.00***			0.00***		

\*\*\* t-ratio significant at 1% level of probability; \*\* t-ratio significant at 5% level of probability. Source: field data analysis 2014.

The analyses showed a positive significant ( $p < 0.01$ ) relationship between public land tenure system and rice productivity, but a negative associations between communal private land tenure systems and productivity (Table 3). These were unsurprising findings. A fairly-large literature had pointed to the short comings of customary forms of land tenure system (Adeboye 1967; Adeniyi 1972; Fabiyil 1974; Famoriyo 1979; Olatunbosun 1975; Oluwasanmi, 1966, & Osuntogun 1976). These problems relate to fragmentation of landholdings and the fact that communally-held land may likely not be used as collateral security for formal loans to increase farm investments that improve productivity.

Leaseholds or land rent accounted for highest proportion of respondents (40.8%) who practiced individual tenure systems but regrettably high costs of leased land per (eg. ₦ 12,676 per ha/ session) as observed by Henri –Ukoha et al (2014) in eastern Nigeria coupling with short rent duration of between 1 and 2 years likely affected farm investments. Productivities were therefore highest under public land tenures (Table 3.)

#### 4. Conclusion

Communal land tenure is still the predominant system under which female headed rural households access farmland in Enugu State even though productivities are higher on publicly-held and cultivated plots lands reforms have minimum positive productivity effects, however, reforms offer limited access to farmlands. There were productivity gains of about 1.31% per hectare under public land tenure system but losses of 3.44%, and 4.51% for individual and communal tenures respectively were observed despite the significantly positive influence of labour time, and quantity of fertilizer applied per hectare. Landlessness and insecurity of tenure due to traditional customary land tenure issues are major constraint militating rice productivity in Enugu State in Nigeria.

There is need to review Nigeria's land use Act 1978 to allow improved farm land access to small farmers; it is hoped that this would further rationalize the customary tenure arrangement which is typically based on inheritance. Furthermore, farm settlement schemes should be revitalized wherein farm plots would be accessed ready without gender bias, for agricultural production.

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