FACTORS INFLUENCING LAND FRAGMENTATION AMONG YOUTH RICE (*ORAZA SATIVA*) FARMERS IN CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study analyzed factors influencing land fragmentation among youth rice farmers in Cross River State, Nigeria. The research employed a multi-stage sampling technique to collect primary data from 216 rice farmers using structured questionnaires. Descriptive and inferential statistic was used in data analysis. Among the four functional forms that were estimated, double log form was chosen due to a high R^2 (70%), with six (6) significant variables and F statistics value is significant at 1%. The estimated R^2 shows that the independent variables explain 70% of variations in land fragmentation index is explained by the characteristics of rice farmers and other variables. The result reveals that distance between plots, distance from homestead, household size, plot size, farming experience and extension visit are the significant factors that influences land fragmentation in the study area. The findings revealed a male dominated sector with (65.1%), 71.6% significant proportion of farmers having secondary education, Majority (66.8 %) of the respondents were married, while 33.2 % were single, 57. 9% had 1-5 years of farming experience, majority (88.2%) of the respondents had no access to credit, most (94.3%) of the respondents cultivated 0.01-0.50 hectare of land. Rice farming was profitable, with a substantial Return on investment per naira of ₦2.01.

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INTRODUCTION

Land is considered as one of the most important resources in agriculture (Songoro, 2019). However, land ownership, urbanisation and the ever-increasing population make it difficult to really access the full potential that lies in this asset. World Bank (2013) reported that agricultural land in Nigeria covers 531,765 sq. km in the early 1960s and as at 2013 stands at 708,000 sq. km which is increasingly less sufficient to meet up demand for it. Land availability for agricultural production in Nigeria involves a complexity of interacting variables such as population, land tenure system, level of technology and the stage of the country's development as well as land fragmentation (Ojo, 2008). These variables, especially land tenure systems and land fragmentation has put serious limitations on the amount of land that is available for both small and large scale agricultural productions because land is communally owned in the various communities and no single person has exclusive right over the piece of land, he/she is using for agricultural purposes. Land is unlike other commodities that can be bought and sold in that it is immoveable (Mahoney, Dale and McLaren, 2017). Land is the major source of wealth and livelihood in rural area, as in Nigeria and other countries, although the land ratio is one of the lowest in the world estimated at 0.12 ha (FAO, 2016). Human being over time accumulates relevant knowledge and skills to manipulate land resources to provide goods and services for their continued sustenance (Songoro, 2019).

Land fragmentation has been a prominent feature in many countries since at least the 17th century (Lusho and Papa, 1998). According to Tesfaye, Jack and Luuk *(*2020) Land fragmentation refer to the production of crops on disjointed multiple plots. Songoro (2019) defined land fragmentation as a "misallocation of the existing stock of agricultural land." He points out that a fragmented farm is a farm consisting of two or more parcels of land so located one to another that it is not possible to operate the particular farm and other such farms as efficiently as would be the case if the parcels were reorganized and recombined. There is an agreement that the four main factors that trigger land fragmentation are: inheritance, population growth, land markets and historical/cultural perspectives as review by (Nyariki, 2015). Other factors noted in more specific situations include: social and administrative decrees (Reuben, Japhet, Agnes and Felix, 2017).

In Nigeria and Southern part in particular, there are various land tenure systems being practiced, these include communal land, Government trust land, and privately owned land.

Some problems are believed to be associated with land fragmentation but those that are prevalent are the small size, irregular shape and dispersion of parcels. Land fragmentation eventually leads to suboptimal use of factor inputs lowering overall returns expected from a certain parcel of land (Reuben *et al.,* 2017). Land fragmentation is a major threat to efficient production system due to the fact that continuous subdivision of farms would lead to small sized land holdings that may be hard to economically operate. If the plots are located far from home, and far from each other, there is a waste of time for the workers spent on travelling in between the plots and home. Management, supervision and securing of scattered plots can also be more difficult, time consuming, and costly (Reuben *et al*., 2017). Land fragmentation has been repeatedly reaffirmed in many national and internationally workshops and research work but there is no research information on factors influencing land fragmentation among rice farmers in Cross Rivers State, Nigeria.

MATERIALS AND METHOD

Study Area

The study was conducted in Cross River State. The state is situated in Nigeria's Delta region, in the tropical rainforest belt (Osadebamwen and Ideba, 2017). It lies between latitudes 5°32' and 4°27' North of the equator and longitudes 7°50' and 9°28' East of green Greenwich Meridian, bounded to the North by Benue State, to the South-west by Akwa Ibom State, to the West by Ebonyi and Abia States. It shares an internal frontier to the East with the Republic of Cameroon, and its Atlantic coastline is to the south, where the Calabar River meets the sea. It covers a land area of 23,074 square kilometers and population of about 1.8 million according to the 2006 census (Osadebamwen *et al*., 2017). The state has 18 local government areas with its capital in Calabar. The climate is tropical-humid with wet and dry seasons, with average temperatures ranging between 15°C - 30°C, and the annual rainfall between 1300 – 3000mm.

Sampling Technique

A multi-stage sampling procedure was adopted to select the respondents for the study. First, a random sampling of two (2) Local Government Area from each of the agricultural zones giving a total of six LGAs (Ikom, Obubra, Yala, Bekwarra, Odukpani and Akpabuyo). The second stage was purposive sampling of two (2) wards from each of the Six (6) selected LGAs making a total of Twelve (12) wards known for rice farming. Stage three, three (3) rice farming communities was selected from the twelve (12) wards making a total of 36 communities known for rice production. Last stage involved random sampling of 6 rice farmers household from the 36 communities making a

total of 216 respondents. In the course of administering the questionnaires, five of the respondents were unable to return the questionnaires.

Date Collection Primary data was used for this research work. The primary data was obtained by administering structured questionnaires to respondents.

Validity and Reliability of the Research Instrument

The data for this study was validated by passing the research instrument through expert in the department of Agricultural Economic and Extension , Federal University Wukari to ensure that it possess both face and content validity.

Data Analysis Techniques

The data were analyzed using descriptive and inferential statistics. Descriptive statistics such as percentages, means and frequency distributions, was use to achieve objectives of the study.

Ordinary Least Square (OLS)

Ordinary Least Square is a Generalized Linear Model. It is prefer they operate on more than one plot of land.

$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + ui$……..……..…(ii)

Where:

Y= Land Fragmentation (Simpson index)

α = Intercept

β = Slope

X_1 = Years of education of rice farmers (years)

X_2 = Farming experience by rice farmers (years)

X_3 = Household size ((number)

X_4 = Plot size cultivated by the farmer (hectares)

X_5 = Distance between plots (kilometers)

X_6 = Distance of plot to homestead (kilometers)

X_7 = Access to extension services (yes =0, no = 1)

α indicates the value of Y when all values of the explanatory variables are zero. Each β parameter indicates the average change in Y that is associated with a unit change in X, and at the same time controlling other explanatory variables in the model.

RESULTS AND DISCUSSION

Socioeconomics characteristic of the respondents

The socioeconomic characteristics considered in the study were: gender, age, marital status, farming experience, educational level, and access to credit, plot size, extension visit and household size.

The distribution of rice farmers by gender is presented in Table 1. The result indicate that male farmers constitute the majority (65.1%) of the rice farmers, while only 34.9% were female. This implies that male gender dominates farming activity in the study area. The higher proportion of male farmers can be attributed to the fact that rice farming requires much time and its laborious nature of farming operations from land preparation to harvesting which their female counterparts cannot easily undertake. This is because farming activity require a lot of energy and is labour intensive especially in the rural area where crude way of farming is practices. This result is in line with Ahmed *et al.,* (2023) who revealed that majority (70.74%) of the respondents were male in the study of profitability analysis of rice production in Hong Local Government Area of Adamawa State, Nigeria. The distribution of rice farmers by age shows that, the mean age of rice farmers in the study area is 32 years which indicates that the respondents are relatively young and physically active. Farmers age determines the type of production to be performed, when farmers are younger, they are more likely to be efficient in labour tasking jobs such as land clearing, harvesting, fertilizer application and packaging. 48.8% of the respondents were within the range of 26 -30 years, 33.7% were within the ranges of 31 -35years, 15.6% were within the ranges of 36 -40 years, (0.5%) were within the ranges of ≤25 years, (1.4%) were within the ranges of ≥41 years. This result is not in line with the findings of Idisi, Ogwu, and Okoli (2019) who analyzed the profitability of rice production in Kuje Local Government Area of Abuja and reported a mean age of 44 years and Ahmed *et al.* (2023) who analyzed the profitability of rice Production in Hong Local Government Area of Adamawa State, Nigeria and reported a mean age of 39 years. Result of marital status of the respondents reveals that majority (66.8 %) of the respondents were married, while 33.2 % were single. This implied that married people were more into rice farming and this can be

traced to the fact that they have more responsibilities like providing the household needs for their families. This finding agreed with the finding of Idisi *et al.* (2019) who reported that majority (86%) of the Rice farmers in his study were married. The distribution of rice farmers by farming experience shows the mean farming experience of the farmers to be 6.68. With this finding, it shows that the farmers in the study area are new into rice production. This result is not in line with the findings of Ben-Chendo, Lawal, Osuji, Osugiri and Ibeagwa (2015) who reported mean farming experience of 11 years. The finding also reveals that majority (57. 9%) had 1-5 years of farming experience, 37.9% are into farming for about 6 -10 years, 3.8% had 11 -15 years of farming experience while 0.5% had less than 16 years of farming experience. This implies that, the output of the farmers might be low due to inexperience in rice production as farming experience is one of the important factor determining both the productivity and the production level in farming activities. It is expected that the higher the farmers' experience in farming, the better will be the production capacity of the farmers. The distribution of rice farmers by educational level reveals that 71.6% of the respondents attained secondary education, 15.2 % attained tertiary education, 12.8 % of the respondents had first school living certificate while 0.5 % of the respondents had no formal education. This indicate that a larger number of the respondents had education which could affect their ability to manage resources effectively, adopt new farming techniques or technologies and their ability to make changes generally. With this high level of education, there will be efficiency in the use of mechanized form of agriculture and there will be less resistant to innovation, also managerial ability will be high. The result is in line with Idisi *et al.* (2019) who reported that 50% of the rice farmers in the study were educated. The distribution of rice farmers by access to credit shows that majority (88.2%) of the respondents had no access to credit while 11.8 % had access to credit. Table 8 depicts that most (94.3%) of the respondents cultivated 0.01-0.50 hectare of land, 4.3% of the respondents cultivated 0.51 – 1.00 hectares of land while 1.4% of the respondents cultivated > 1 hectares of land, and with a mean farm size of 0.29. This is advantageous because it is easy to manage. This finding is in line with Balogun and Akinyemi (2017) who reported mean plot size of 2.688 in the study of effects of land fragmentation on technical efficiency of farmers in South-West geopolitical zone, Nigeria.

Table 1. Respondents Demographic Profile

Variables	**Frequency**	**Percentages**
Gender		
Male	136	65.1
Female	75	34.9
Age		
≤25	2	0.5
26 -30	102	48.8
31 -35	71	33.7
36 -40	33	15.6
≥ 41	3	1.4
Marital status		
Married	70	33.2
Single	141	66.8
Farming Experience		
1-5	80	37.9
6 -10	122	57.9
11 -15	8	3.8
16- 20	1	0.5
Educational level		
Non formal	1	0.5
Primary education	27	12.8
Secondary Education	151	71.6
Tertiary education	32	15.2
Access to Credit		
Yes	25	11.8
No	186	88.2
Plot Size		
≤ 0.01- 0.50	199	94.3
0.51 – 1.00	9	4.3
>1	3	1.4

Factors influencing land fragmentation in the study area

The result of the factors influencing land fragmentation among rice farmers in the study area is presented in Table 2. Among the four functional forms that were estimated, double log form was chosen due to a high R^2 (70%), with six (6) significant variables and F statistics value is significant at 1%. The estimated R^2 shows that the independent variables explain 70% of variations in land fragmentation index is explained by the characteristics of rice farmers and other variables. The result reveals that distance between plots, distance from homestead, household size, plot size, farming experience and extension visit are the significant factors that influences land fragmentation in the study area. Farming Experience was positive and significant at 5%, this implies that, a one unit increase in the farming experience of the rice farmers in the study area increases the degree of land fragmentation by 0.100. This finding is in line with Olumayowa *et al*. (2023) who reported that year of farming has a significant influence on land fragmentation in the study area. For household size, the coefficient was positive and significant at 5%, this means that, a unit increase in household size of the rice farmers in the study area increases the degree of land fragmentation by 0. 084. Which implies that as number of family members increase, there is increase in land fragmentation due to tradition and inheritance believe of the people as available land is share among the household members. This finding is not in line with Ayoola *et al*. (2022) who reported that household size does not have a significant influence on land fragmentation in the study area. Plot Size shows negative influence and is significant at 1%. This means that, a one unit increase in the average plot size of the rice farmers in the study area increases the degree of land fragmentation by -0.833 units. This result in in line with Olarinre et *al*. (2019) who reported that plots size is one of the factor influencing land fragmentation in Osun State, Nigeria. The coefficient of average distance between plots was positive and significant at 1% which shows that a unit increase in distance between plot will increases the degree of land fragmentation among the rice farmers by 0.123 units. This finding is not in line with Abiodun *et al.* (2019) who reported that average distance between plots has no significant influence on land fragmentation in the study area. The coefficient of distance of plots to homestead is positive and significant at 5%, which means that a unit increase in the distance of plots to homestead of the rice farmers in the study area increases the degree of land fragmentation by 0.129 units. When the homesteads are not far from the plots, the rice farmers will increase the number of plots used. This in turn will increase the number of plots used for planting rice, in other words increase in the degree of land fragmentation. This finding is in line with Ayoola *et al*. (2022) who reported that distance to homestead has a positive influence on land fragmentation in the study area. The coefficient of extension visit was positive and significant at 1% which shows that a unit increase in extension visit will increases the degree of land fragmentation among the rice farmers in Cross River State by 0.68 units. This result is in line with Olarinre et *al*. (2019) who reported that extension visit do not have a significant influence on land fragmentation in Osun State, Nigeria. Years in school do not have a significant effect on land fragmentation among rice farmers in the study area.

Table 2: Factors influencing land fragmentation among rice farmers

*****1% significance, **5% and *10% respectively.**

Variable	Coefficient	Standard error	t- value
Educational level (years)	-0.018	0.112	0.646
Farming experience (years)	0.100**	0.061	0.018
Household size	0.084**	0.070	0.045
Average plot size (hectares)	-0.837***	0.039	0.000
Average distance between plot (Kilometre)	0.123***	0.036	0.005
Distance of plot to homestead (Kilometre)	0.129***	0.055	0.004
Access to extension services (yes =1, no=1)	0.068*	0.005	0.096
Constant	0.298	0.337	0.231
R Square	0.706		
Adjusted R Square	0.695		
F – value	69.483		0.000

Source: Field survey, 2023

CONCLUSION AND RECOMMENDATION

It can be concluded that rice farmers in the study area are relatively young and physically active, majority of the respondents were male, married, formal education, had no access to credit. Rice production was profitable in the study area. Farming experience, household size, average plot size, distance between plots, distance to homestead and access to extension services are the factors influencing land fragmentation in the study area.

RECOMMENDATION

1. Agricultural credit facilities should be made available to the farmers who are within the youthful age limit
2. Agricultural land should be allocated more for agricultural purposes in order to expand production

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