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Pattern of Land Use among Selected Crop Farmers in Osun State

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Abstract: In Western Nigeria, farmland is seriously fragmented as a result of tenural arrangement being practiced, leading to individual farm shrinking as the years passed. But the low external input agriculture practiced by the small-scale farmers depends primarily on the expansion of cultivated area at the expense of restorative bush fallow and other land management practices. The nutrient status of the soil thus, declined as the land is getting over utilized. This study therefore examined agricultural land use and management practices among selected crop farmers in Osun State, Nigeria. Three-stage random sampling method was used to select 360 farmers in Ola-Oluwa, Ayedaade, Egbedore, Osogbo, Ife-South and Atakumosa-West local government areas-all distributed among the three agro ecological zones of the State. Out of the 360 copies of questionnaire administered, 301 were found useful for the study. Both descriptive and farming system analysis were used to analyze the primary data. The results showed that 39.5% of the farmers were between 36 and 45 years of age, >84% took farming as their main occupation, 85.8% of the farmer's household members were literate and 6% of the farmers did not actually own the land they cultivated. Farming system analysis revealed average farm size of 3.07 ha and a labour-intensive farming operation.

Key words: Land use pattern, herfindal index, farming system analysis, rutherberg value, land use intensity, land yield

INTRODUCTION

Land as a factor of production and as a natural resource is a critical input in agricultural production. The criticality is imposed by its availability, accessibility, quantity and quality. In Nigerian agriculture, the quality factor stands out as a major determinant of land productivity. This is due to the problems associated with sourcing artificial amendments that can improve the productivity of land especially by subsistent farmers that dominate the arable crop production landscape.

Reid *et al*. (2006) submitted that although, estimates of the effects of land degradation on food production are rare, it had been realized that the problem often leads to drastic reduction in agricultural production by necessitating the use of higher level of inputs to maintain yields, temporary or permanent abandonment of plots and conversion of land to lower value uses. A global analysis by Lane revealed that during the 1970s, 1 ha of Arable land supported an average of 2.6 people; it was projected that by the 2000, given the present population projection, 1 ha of land will be supporting 4 people.

Also, Rosegrant and Cline (2003) reported that while, food production in 1993 had been derived from 748.6 million ha, it has been projected that 795.5 million ha will be needed in 2020 to meet up with world's food requirement. It was likewise stressed that the land constraint, among other constraints, will make rice production to only grow by 1.05%, 1993 and 2020, 1.17% in wheat and 1.03% in maize.

Nigeria food problem shows both in quantity and quality. Tied to low agricultural production and productivity is the increasing relative and absolute poverty of the farming population in Nigeria. Although, as observed by Swinton *et al*. (2003) the land management pursued by wealthier household may increase some forms of resource degradation (e.g., more soil erosion due to use of mechanical equipment, or more damage to water resources and biodiversity due to greater use of agro-chemicals), while reducing other forms of resources degradation (e.g., less soil nutrient depletion as a result of greater ability to purchase fertilizers or greater ownership of livestock and recycling manure). The need for increased food production call for knowing the socio-economic characteristics of the farmers, know the farm characteristics in term of physical inputs used as well as highlighting the farmers pattern of land use in the study area.

Apart from this, land is the major resource for the livelihood of the poor. In Nigeria, a typical villager recognizes land in its entirety. According to Fabiyi (1990), land to a farmer is home and work place and shares, it with the entire biotic complex. As a result, data collected on the farmers' pattern of land use farm characteristics in term of

physical inputs are good reference materials that would guide agricultural economists and extension workers wishing to plan a strategic agronomy-based extension service delivery for farmers.

Finally, there is the need to develop a benchmark of wider dimension that would identify land-use indices and threshold in a typified smallholder farming system. This is even more important now that the Federal Government of Nigeria is exploring ways of sourcing revenue from non-oil sector. The consequence of enhanced production is also most likely to result in enhanced welfare for crop farming communities.

Objective of the study: The main objective of the study is to identify the determinants of input use among crop farmers in South-Western Nigeria. The specific objectives are to:

- Describe the socio-economic characteristic of the farmers
- Highlight the farmers' pattern of land use
- Evaluate elasticities of land use intensity, land yield and labor productivity

Hypothesis of the study: The hypothesis is stated in the null form that there is no significant difference between land use intensity, land yield, labor productivity and farm size.

MATERIALS AND METHODS

The study was conducted in Osun State of South-Western Nigeria that is made up of three agro-ecological zones, characteristics of some of the South-Western States of the federation. The state has 6 administrative zones and 30 local government areas. The predominant farming system in the area is shifting cultivation with mixed cropping and crop rotation. Crops cultivated include maize, yam, cassava, cocoyam, cocoa, kolanut, citrus and vegetables. A three-stage sampling procedure was adopted in proportionately selecting 71 respondents from Iwo (Savannah zone), 109 respondents from Osogbo (Derived savannah zone) and 180 respondents from Ife/Ijesha (Rainforest zone) zones of the State. Out of the 360 questionnaires administered, 301 were found to be useful for the study. The primary data collected were coded and subjected to both descriptive statistics and land use pattern analysis.

The descriptive statistics used are frequency and percentage distribution to describe the socio-economic characteristics of the respondents while the analysis of land use pattern was done by measuring the index of crop diversification and the land use intensity of all arable fields is estimated using Ruthenberg (1980) value. The Crop Diversification Index (CDI) used is the Herfindal Index given as:

$$CDI_h = \sum_{i=1}^{n} P_i^2 \quad (1)$$

Where:

P_i = Proportion of net income from the crop

Ruthenberg value: The land use intensity of all arable fields is estimated following Ruthenberg (1980) calculation. This is represented by the degree of residence or R-factor. This factor can be calculated in the spatial dimension by dividing the cultivated area (S), by the total Usable area (U), i.e.,

$$R = S/U \quad (2)$$

However, whereas cultivated area is physically marked and hence, relatively easy to measure, total usable area, i.e., cultivated and fallow land is difficult to define and measure in the field. On the other hand, farmers easily remember the length of the cropping and fallow period of their fields. Therefore, the land use intensity is estimated in the temporal dimension by dividing the Cropping period (C), of the field by the total length of a rotation cycle, i.e.,

$$R = \frac{C}{C + F} \quad (3)$$

taking into account the Fallow period (F). The Eq. 3 allows us to obtain an estimate of the total usable area, i.e.,

$$U = S/R = \frac{S(C + F)}{C} \quad (4)$$

Elasticity of land use intensity, land yield and labour productivity with respect to farm size: The following models have been estimated for each of the selected local governments, as formulated by Cornia (1985) to evaluate the elasticities of land use intensity, land yield and labor productivity:

- Resource use

$$\log LUI = a + b \log LN \quad (5)$$

- Land yield

$$\log GO/LN = a + b \log LN \quad (6)$$

- Labor productivity

$$\log GO/MD = a + b \log LN \quad (7)$$

Where:
MD = Man-Days
LUI = Land Use Intensity
GO = Gross Output
LN = Farm area

RESULTS AND DISCUSSION

Table 1 reveals that about 69.8% of the farmers are between 16-45 years of age, showing that they are in active age brackets. The mean age is 46.81 and this has implication on the available family labor and productivity of the labor because age has a direct bearing on the availability of farm labor and the ease with which improved agricultural practices are adopted. The gender distribution of the farmers depicts more male (94.01%) than female owning farms. This result conforms with the cultural setting in the study area, where male have more access to land than female.

Also, the main occupation of most of the sampled farmers is farming and larger proportion (84%) of them depends on crop production for daily existence. This result has effect on the level of cropping pattern and intensity, in which the agricultural land is used. Majority (95.10%) of the respondents are married, 4.3% are single and just 0.3% each are widowed and divorced.

Most of the farmer's households (85.8%), male and female have at least a primary education. Those households with tertiary education probably constitute the civil servants, who engaged in part-time farming in the area. This is expected in line with a priori expectation, to have significant impact on productivities income earning opportunities and ability of farmers to effectively adopt better management practices.

Table 2 shows that 52.5% of the farmers had two-crop mixture on their farm with combination mean of diversification index being 0.714. For the four-crop combination and five-crop combination, the average H-index is 0.433 and 0.218, respectively. The result however, shows that as the number of crops in combination decreases, the H-index increases and would become one for sole cropping implying specialization. But on the average, the H-index for all the sampled farms is 0.578. The H-indices show that the sampled farmers undertook one form of cropping diversity or the other, but the majority of them practiced one to two crop combinations.

Table 3 shows that an inverse relation between farm size and land productivity is generally found. All parameters are negative and significant with the exception of Ola-Oluwa and Egbedore LGA for which no significant relationship were found. The negative elasticities are much higher for the land-rich areas like Ayedaade than for the densely populated Ife South and Osogbo LGAs, where land use patterns among different classes of farms are less diverse than in other developing areas.

Likewise, land use intensity (which is defined as the ratio of cropped to farm area and which therefore, reflects both different land use patterns and cropping intensity) is negatively related to farm size in Ayedaade and

Table 1: Distribution of respondents by their socio-economic characteristics

Characteristics	Frequency	Percentage
Age group (years)		
16-25	14	4.70
26-35	77	25.60
36-45	119	39.50
46-55	36	11.90
56-65	44	14.60
>66	11	3.70
Gender		
Male	283	94.01
Female	18	5.99
Occupation		
Crop production	253	84.10
Livestock production	7	2.30
Non-farm activities	41	13.60
Marital status		
Single	13	4.30
Married	286	95.10
Widowed	1	0.30
Separate	1	0.30
Household eduction level		
No schooling		
Male	79	6.60
Female	91	7.60
Primary level		
Male	222	18.60
Female	210	17.60
Secondary level		
Male	235	19.70
Female	166	13.90
Tertiary level		
Male	145	12.20
Female	39	3.50

Table 2: Herfindal index of crop diversification

Descriptions	Frequency	Combination	SD	Min.	Max.
Sole cropping	63.0	1.000	1.000	1.000	1.000
2 crop combination	158.0	0.714	0.051	0.323	0.875
3 crop combination	50.0	0.526	0.118	0.427	0.662
4-crop combination	27.0	0.433	0.101	0.152	0.609
>5 crop combination	3.0	0.218	0.073	0.198	0.414
Sample mean	60.2	0.578	0.269	0.420	0.712

Field survey (2005/2006)

Table 3: Elasticities of land use intensity, land yield and labor productivity with respect to farm size

Selected LGA	Gross Output/ha (GO/LN)	Land use Intensity (LUI)	Gross output/ Man-Day (GO/MD)
Ola-Oluwa	-0.63	-0.29	1.07*
Ayedaade	-1.26***	-0.47**	0.33
Egbedore	-0.95	-0.31*	0.15***
Osogbo	-0.26**	0.08*	0.09**
Ife-South	-0.18**	0.05**	0.58
Atakumosa	-0.32*	0.17*	0.29*

Field survey (2005/2006)

Egbedore, while for Osogbo, Ife-South and Atakumosa West, the relation is positive. It follows that the relation between farm size and land-yield is less pronounced if differences in land use patterns and cropping intensity are accounted for.

Also increasing average labor productivity is found with the growth of farm size. All the elasticities are found to be significantly positive with the exception of Ayedaade and Ife-South. Therefore, the null hypothesis that there is no significant difference between land use intensity, land yield, labor productivity and farm size are rejected.

CONCLUSION

The results also showed that mixed cropping constituted the major cropping pattern in the area and cassava, maize, pepper, Okra and Yam were the most preferred cultivated crops. In terms of intensity of cultivation, the Rutherberg value of 0.589 showed that farming system practiced in the areas was moving towards permanent cultivation under the natural fallow management system. Furthermore, Herfindal index of 0.578 showed low level of crop diversification.

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