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Effect of property rights and land management practices on crops productivity among farmers in Oyo State, Nigeria

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Abstract. This study analyzed the effect of property rights and land management practices on crops productivity among farmers in Oyo State, Nigeria. Multi-stage sampling techniques were used to select a total number of 250 farmers in the study area. A production function based on transcendental logarithmic model was used to capture economic and land management variables considered. Also, the determinants of input use and land management practices were investigated via the use of logit model. The results showed that the mean age of farmers is 46.1 and more than 84 percent took farming as their main occupation, 83.3 percent of the farmer's household members were literate at primary level and 16 percent of the farmers do not actually own the land they cultivated. In terms of intensity of cultivation, the Rutherberng value of 0.589 showed that farming system practiced in the state was moving towards permanent cultivation under the natural fallow management system. Furthermore, Logit analysis showed that age, farm size, income, extension agent, land price and risk bearing have significant effect on land management practices and crops productivity. The study therefore suggested some recommendations which include: introduction of better land management practices, provision and use of land augmenting material that would ensure land management quality maintenance and input use productivity; introduction of price support program by the government. Also, government should formulate and implement economically viable land reforms policy to ensure that the farmers feel emotional attachment to the land they cultivate.

Key Words: Property rights, land management, crop productivity.

Introduction. Property rights issues are important in the discussion of improved technologies adoption and land management practices that can help people and reduce environmental degradation (Meinzen-Dick & Gregorio 2004). Many improved land management practices require long term investments; farmers will only make these investments if they have long-term rights to their land. Many land resources management practices have to be undertaken by groups of farmers working together because they require effective community management. Ineffective collective actions at the local level become a constraint to the adoption of the land tenure system and, by extension, streamline land registration types of land management practices. Property rights and land management practices affect wide-range of resource use and investment activities in the developing world. Prominent examples include grazing land practices and investments, soil fertility, management and keep up of indigenous irrigation schemes (Bromley & Cernea 1989). In Nigeria, land reform agendas have concentrated almost exclusively on privatization and individual titling; even though there is a general acknowledgement that privatization may not always offer the best solution (Momodu 2000). The key question that remains, however, is what types and perhaps combinations of property rights and land management institutions are needed in different situations, in order to achieve the best patterns of development.

Property right and land management institutions typically have their roots in local indigenous arrangements, and they are evolving over time with mixed success in response to growing population pressure and agricultural commercialization.

In Nigeria, the consequence of food scarcity and nutrition at household level is grave and the need for increased food production calls for better management of available production inputs, land, labor, capital and entrepreneurship. Land reform experts claim that the main obstacle to increased agricultural output is shortage of land and population pressure. An effort to increase food production depends primarily on expansion of cultivated area at the expense of restorative bush fallow, thereby causing a considerable decline in the length of the cultivation cycle in slash and burn cultivation (Spencer 1989). Farmland is therefore seriously fragmented, especially in western states of Nigeria where inheritance tenure arrangement is practiced and this process has been going on for generations, leading to individual farm shrinking as the year passed. Land management practices affect the fertility of the land to the extent that the clamor for conservation farming system and management has been a re-awakening issue for researchers and policy makers.

Within the foregoing context, the following questions are fundamental:

(i) What is the socio-economic characteristic of the farmers that influences their land management practices?

(ii) What is the effect of property rights and land management practices on crop productivity in the study area?

(iii) What are the patterns of land use and management practices of the respondents?

(iv) What are the types of property rights indicator in synonymous to nature of land property rights?

(v) What are the types of improved land management practices adopted in the study area?

The broad objective of the study is to analyze the effect of property rights and land management practices on crops productivity among farmers in Oyo state, Nigeria.

The specific objectives are to:

(1) describe the socio-economic characteristics of farmers which has potential to influence land management practices of respondents;

(2) analyze the effect of property rights and land management on crop productivity in the study area;

(3) analyze pattern of land use and management practices of the respondents;

(4) examine the type of property rights indicator in synonymous to the nature of land property rights;

(5) identify the types of improved land management practices adopted in the study area.

Statement of yypotheses.

1. Ho: Property rights are not related to adoption of land management practices and to farm productivity in the study area.

Ho: $\beta 1 = \beta 2 = \beta 3 =$_____$= \beta n = 0$

Ha: Property rights do affect adoption of land management practices in the study area.

H_A: $\beta 1 \neq \beta 2 \neq \beta 3 \neq$_____$\neq \beta n \neq 0$

Where $\beta 1$ (i = 1 to n) referred to the vector of parameters that determine the effect of property rights on the adoption of land management practices in the study area.

2. Ho: There is no significant relationship between the interaction effect of land use and management variables and the output level.

Ho: $\alpha 1 = \alpha 2 = 0$

H_A: There is significant difference between the interaction effect of land use and management variables and output level.

Where $\alpha 1$ and $\alpha 2$ represent the expected interaction effect of land use and management variables and output level.

With increasing pressure on land, it becomes crucial for policy makers to monitor land management changes and, if necessary, influence these changes according to specific objectives through policy mechanisms. Also, increasing resource scarcity

necessitates the urgency to understand the environmental consequences of farmers' production decisions.

Integrated research, involving socio economic and ecological models for studying land management is a practical way to establish trade off and to minimize conflicts which is a necessary condition to achieve sustainable development. It will establish the relation between ecological and socio-economic characteristics, especially to explain the effects of environment on farmer's choice of enterprises and technical methods and to clarity their attitude to innovation and risk. Study on the use and management of an economically valuable but exhaustible resource like land has policy relevance in agricultural development. Many studies on subsistent agriculture are framed and modeled on the neo-classical economic optimization without paying adequate attention to the neo-classical variables like land management practices and their marginal effects on crop production.

The fact that the study has not been carried out in the study area before further justifies the investigation, similar studies like Patricia (1995) excluded important variables such as net farm income and years of fallow as determinant of productivity. This paper included these variables in order to really explain the productivity potential of the study.

Material and Method. The study was carried out in Oyo State, Nigeria. This state is an inland state in south-western Nigeria with its capital at Ibadan. It is bounded in the north by Kwara state, in the east by Osun State, in the south by Ogun state and in the west partly by the Republic of Benin. It was formed in 1976 from the former Western State, and originally included Osun State, which was split off in 1991. Oyo state is homogenous, mainly inhabited by the Yoruba ethnic (Wikipedia 2007).

The indigenes mainly comprise the Oyo State, the Ibadan and Ibarapa, all belonging to Yoruba family and speaking the same Yoruba language. The state consists of thirty three (33) Local Governments Areas with a total population of 6,617,720 inhabitants (Census 2006). The capital, Ibadan is reported to be the largest city in Africa, South of Sahara other notable cities and towns in Oyo State include Oyo, Ogbomoso, Iseyin, Kisi, Okeho, Saki, Eruwa, Lanlate, Awe and Igbo Ora. The climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantain, cocoa tree, palm tree and cashew. Oyo State is located within longitude 8^{o} and latitude 3^{o} 28E with annual rainfall of 1247mm (Wikipedia 2007).

The study area lies in the rainforest zone of Nigeria and this has made about 80% of the inhabitants to engage in agriculture. There are two distinct seasons, rainy and dry season. The rainy season starts in Oyo State during the first week of March and lasts till the Month of October, while the dry season lasts November – March, all things being equal. The low rainfall is marked by the period of August break in August. Mean temperature varies from daily minimum of 25^{o} c to a daily maximum of 35^{0}c. Humidity is quite high in Oyo State. Relative humidity in the State is around 70 percent with a minimum of about 60 percent in the evening and a maximum of around 80 percent in the morning (Wikipedia 2007). The traditional Land Management practiced by the people was the traditional shifting cultivation which involves the practice of cultivating a piece of land for a particular year and then leaves such land to rest for a long period of time before returning to the land. Increased population triggered off an increased demand for land which made the available land insufficient for agricultural and housing purposes.

The people in the study area engaged in the farming enterprises that degrade the land the more. The farming practices notable among them are those that involve slash and burn, deforestation, farming on a slopping land at the expense of future production.

Indiscriminate exploitation of forest in the study area has always been on the communal and government land. The consequence of those practices is soil erosion in the study area. Exposure of the land at the mercy of torrential rainfall has ignited land degradation on most of the farming land in the study area and hence this situation has informed the study of Land Management practices by crop farmers in the area. The choice of the study areas was based on the predominance of farming occupation over other occupations in the local areas.

Figure 1. Map of Nigeria showing Oyo State where the study areas are located (Source: World atlas travel).

Data for this study were obtained in 2008, from a sample survey of Ogbomoso North, Ogbomoso South, Orire, Surulere and Ogo- Oluwa Local Government areas, Oyo State, Nigeria. Primary data were collected using well-structured questionnaire and interview schedule. Descriptive statistics such as frequency and percentage distribution mean and standard deviation was used to describe the socio-economic characteristics and pattern of land management practices of respondents.

The rights on plot being specific, it could be more interesting to work at the plot level concerning property rights than at the household level. But there are studies that show that coexistence of plots with secure rights and plots with insecure rights affect strongly the management of the plots of insecure and precarious rights. This is due to the influence of the existence of plots with secure rights on the potentiality of risk taking. If the dummy variables in models allow solving this problem econometrically, they do not measure the quantity of property rights possessed by farmer (Sthiannopkao et al 2007). This may be important for gender comparison and to determine the effect of land property rights on some variables measured at household level such as the amount of credit borrowed.

Therefore, only rights of regulation that include rights of management (b, d, e), rights of exclusion (f, g, h) and the right of alienation (c) are considered in the construction of indicator. Similarly, the size of holding is taken into account because using discounted income, the precarious rights exerted by a farmer on a plot of land of greater size could be more beneficial than durable rights exerted on a plot of smaller

size. The utilization of weighted averages with areas as weights would continue to mask this aspect.

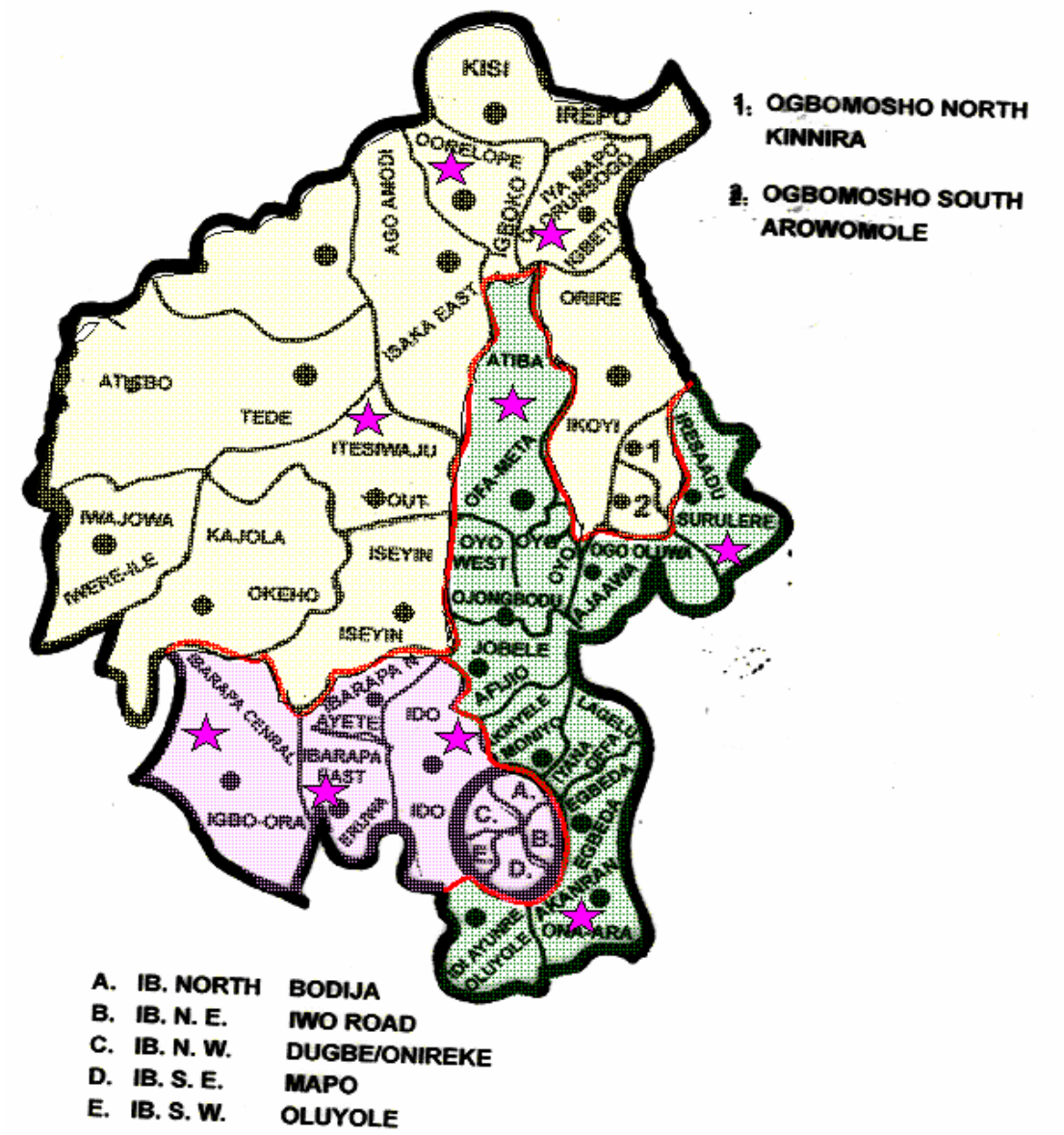

Figure 2. Map of Oyo State showing the selected Local Government Areas (Source: Website of Oyo state government).

The indicator is built by using Borda rule. Indeed, criteria (d to h) are more ordinal than numerical. For that reason, the different plots are sorted in ascendant order according to each criterion or "voter" and the ranks are summed up for each farm. The farm whose total score is the highest is the one with highest property rights.

The disadvantage of Borda rule is that it violates the axion of irrelevance of independent alternatives of Arrow (Defoer 2000). Thus, the presence of other farms may strongly impacts on the relative rank of two others.

Borda rule applies as a function of property rights given by:

$$PRB_i = \sum_{j=1}^{j=8} R_{ij}$$

PRB_i = gross indicator of the bundle of property rights held the farm I;

R_{ij} = rank granted according to the criterion j to the farm i.

This indicator is normalized between 0 and 100 by using the following transformation:

$$PRNi = \left[\frac{m_p(i) - \min\left[m_p(i)\right]}{\max\left[m_p(i)\right] - \min\left[m_p(i)\right]} \right] * 100$$

$m_p(i)$ = the sum of the ranks corresponding to the farm i;

PRN_i = normalized indicator of the bundle of property rights for the farm i.

The higher the indicator PRN_i the heavier the bundle of property rights associated with the farm i.

Results and Discussion. The parameter estimates obtained from the Binomial logit model are reported in (Table 1). At convergence, the log-likelihood function is -129.2323. The model is found to be statistically significant with statistical of 0.01, 0.05, and 0.10 percent which are beyond the critical value (with 9 degree of freedom at alpha equal to 0.05). In addition to all of the attributes being found significant, they are also estimated with the expected signs.

Table 1

Determinant of land management practices (Logit) (Source: Field survey 2008)

Variable		*Fallow*	*Crop rotation*
Property rights			
Purchase		-0.7850**	2.4271***
Rent		1.8724***	-0.3177
Inheritance		0.9483**	2.0014***
Borrowed		1.2248***	-1.5469***
Human capital			
Male household member	Primary education	-1.40	-0.137
	Secondary education	0.066	0.062*
	Tertiary education	0.572***	0.175
Female household member	Primary education	0.240	0.341
	Secondary education	0.150	-0.044
	Tertiary education	0.034	-0.461
Primary source of income of the household / head			
Livestock		-0.286	-0.154
Non-farm		0.301***	-0.158
Natural capital			
Investment on land		1.114**	-1.096
Farm size (ha)		0.485**	-0.017
Physical capital			
Fixed capital		0.036	-0.708
Access to farm and services			
Access to credit		-0.244	-0.104**
Number of extension visits		-0.575	-0.246
Distance of farm to residence (km)		0.066	0.037
Village level factor			
Agro-ecological zone	Savannah	0.164	-0.173
	Derived savannah	-0.121	0.038
	Rainforest	0.305	0.226**

***Significant at 1%, **Significant at 5%.

The variable with 'no' land management practices were taken as the base line category or reference cell. The calculations of the odd- ratio for all the response categories were done relatively to the baseline. The positive coefficient implies that probability of a respondent falling in the enumerator's category (land management practices) is greater than the probability of falling in the base category. Only significant variables are discussed in the presentation. Chi-square distribution was used to test overall model adequacy at specific significant level. Likelihood ratio also determines whether the multinomial logit model is preferable to a binomial logit model.

The coefficient of parameter estimates for age implies that younger farmers adopt more management practices than the older ones. This may be as a result of awareness of importance of such practices to farmers of this age than aged farmers.

Farm size has a positive and significant relationship with management practices because farmers with larger farm size take farming as their primary occupation and thus give adequate attention with required management practices than subsistent farmers who combine farming with non-farming activities for income generation. The respondents visited by extension agents have a positive and significant association with the use of management practices. This is in line with a priori expectation indicating that emphasis on the importance of the management practices are made by the extension agents.

There is negative relationship with educational level and land management practices level, although the relationship is not statistically significant at any level i.e. 1%, 5%, and 10%. This may be as a result of higher opportunity cost for educated farmers which make them to go for non farming activities as primary source of income. The more experience they have, the more the land management practices adopted. The risk taken pays off in terms of output and thus is more encouraged to be involved in land management practices.

Conclusions. The results of this research have provided a number of meaningful observations relevant to the debate surrounding the use of property rights, land management practices and crops productivity. Also some important areas for further research were highlighted.

This study illustrated the importance of distinguishing farms by size. For example, it showed that the smaller the farm, the less likely that land be managed. During the past ten years, no farmers were visited by an extension agent or received credit from agricultural bank. They had fewer titles and documents for their land and less technical and financial assistance; yet, they were the most prone to improved land management practices. The mid-size could fallow a portion of their land at any given time. Not surprising, the use of chemical inputs, and higher labor increased with farm size. A key factor behind growing poverty is the increasingly insecure relationship between people and the land. Land is the most important resources in rural and agricultural country like Nigeria. Without owning or having access to land, people cannot sustain themselves. Over the past ten years, the dispossession of small peasant producers from their land has increased dramatically; today at least 60 percent of rural families are landless. These people are turned into seasonal laborers, working or share cropping on land belonging to other. So, the government should formulate and implement economically viable land reforms policy to ensure that the farmers feel emotional attachment to the land they cultivate. Enforcing land reform and agricultural development policies Nigeria's future lies on its enormous potential. But without ensuring the land ownership and property rights, there is a little hope for development. Moreover, there will be a continuing migration of rural people to urban. If an appropriate mix of land reform and agricultural development policies were adopted, Nigeria could meet its food needs as well as ensure rural employment in agriculture since the sector still accounts for the overall employment. In addition to agricultural development, there is need to create many more sources of non-farm incomes for rural people. This will also require substantial policy change aimed to encourage the production of goods for local consumption.

The research study done on effect of property rights and land management practices on agricultural productivity in Oyo State indicates the fact that proper land ownership policy is vital in order for vast majority of population living in rural areas

whose income is dependent on farming. The problem faced commonly by the farming population, who are in large extent small-scale farmers, is the increasing rate of poverty caused by maladministration of land ownership. Due to this insecure property rights the farm household do not feel emotional attachment to the land that inhibit the land productivity and environmental sustainability as well. It is imperative that land administration departments of this country should ensure good governance and transparency in ensuring proper property rights.

The study revealed that land management practices such as fallowing of land and use of livestock manure are major contributors to increased crop productivity in the study area. Also it was found that smaller farms are less likely to fallow.

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