

EFFECT OF LAND FRAGMENTATION ON FARMING INCOME IN TWO
LOCAL GOVERNMENT AREAS OF EKITI STATE.

BY

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CERTIFICATION

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DEDICATION

I dedicate this project to GOD ALMIGHTY who has made it a fulfillment for me to complete the project successfully.

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ABSTRACT

Land has been seen as the composition of all naturally occurring resources whose supply is inherently fixed while, fragmentation of land has been argued as the scattering of land through which single farm consist of numerous spatially separated plots. Past studies and literature has shown that fragmentation is common among small scale farming and affecting farming outputs. Evidence abounds in past works in agricultural development that multiple use of land has been generally influenced by availability of land for agricultural purposes, proximity of the land to market and farm inputs, financial gains and demand. Hence, this study examined the effect of land fragmentation on small farming household income using Ikole and Oye Local government areas of Ekiti State as a case study. The objectives are as follows; to examine farming plots available for agricultural purposes, estimate causes and effects of fragmented farm land on farming operations and factors affecting scattered/fragmented (individual) farm. A multi-stage stratified random sampling technique was employed to collect data from 100 respondents out of which 80 data were useful for subsequent analysis. Information was collected through structured questionnaire on respondents' socio-economic variables and other factors influencing land fragmentation and farming outputs. Results revealed that the modal age range of the respondents is 41-50 years. Mean household head age is 48 years with standard deviation of 8.67. Majority of the respondents had post-secondary education are in modal class of 37.5%. Results also indicate that 60.0% of the respondents fall between house hold sizes 4-10 with mean of 8.36. The results also revealed that in the lower category of farm size had higher incomes. Farmers that had 2 and 3 multiple lands for farming are in the majority (78.7%). Thus, this evidence revealed that fragmentation had effect of small farms outputs and income. The small farmers that had multiple farms had a higher income. Multiple regression results revealed that six farmer-level factors are significant variables in influencing land fragmentation. Years of education are one of the important variable influencing farmers' accessibility to the use of multiple lands for agricultural activities.

Keywords: Land tenure, fragmented land, income, multiple regression, Ekiti State, Nigeria

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CHAPTER ONE

INTRODUCTION

1.1. Background to the study

Land is said to comprise of all naturally occurring resources whose supply is inherently fixed (Fisher, 1987). Past studies have indicated that land comprises of all particular geographical locations, mineral deposits, forests, fish stocks, atmospheric quality, geostationary orbits, and all portions of the electromagnetic spectrum. Natural resources are fundamental to the production of all goods, including capital goods (Fisher, 1987). Land has been described to possess a perfectly inelastic supply curve, suggesting that a land value tax that recovers the rent of land for public purposes would not affect the opportunity cost of using land, but would instead only decrease the value of owning it (Alves, 2009). This view is evidenced through the market value of land that can come on and off the market (Alves, 2009). Land is the geographic locations and house of mineral deposits, which is historically seen as the cause of much conflict and dispute (Alves, 2009). Land reform programs, which are designed to redistribute possession and/or use of geographic land, to reduce conflicts over the economic rent of mineral deposits have contributed to many civil wars (Alves, 2009). Land can also be considered as one of the three factors of production along with capital, and labor (Coulomb, 1994). In addition, man has continued to divide this land

and the resources among themselves for which they have continued to fight one another to this day (Wehrmann, 2008).

Land is sometimes merged with capital to simplify micro-economics. However, a common mistake is combining land and capital in macro-analysis (Coulomb, 1994). Income that is derived from ownership or control of natural resources is referred to as rent (Coulomb, 1994). Land fragmentation, which is also known as scattering of land, is defined as the situation in which a single farm consists of numerous spatially separated plots (Abdelali et al 2003). Land fragmentation as a fundamental rural spatial problem concerned with farms which are poorly organized at locations across space (King and Burton, 1982).

(Van Dijk, 2004) distinguishes four types of land fragmentation as follows:

1. fragmentation of land ownership;
2. Land use;
3. Within a farm (or internal fragmentation); and
4. Separation of ownership and use.

Hence, fragmentation of land ownership refers to the number of landowners who used a given piece of land. Fragmentation of land-use refers to the number of users that are also tenants of the land (Yates, 1960). Internal fragmentation emphasizes the number of plots exploited by each user and considers plots size, shape and distance as the main

issues (Yates, 1960). Separation of ownership and use involves the situation where there is a discrepancy between ownership and land use (Yates, 1960). Land fragmentation is considered by agricultural policy makers as the source of ineffective agricultural practises and thus it must be prevented by legislative actions. Similarly, economists, although believing that land fragmentation can be adaptive under certain conditions, recognize that this phenomenon gradually becomes non-adaptive as technology improves and the relevant costs changes (Bentley, 1987). Land fragmentation also affects the development of agricultural sector (Boserup, 1965). When cooperative and state farmlands were distributed according to equity principles, without first taking farm management aspects into consideration, the result was that the plots which farmers received were either too small or were badly shaped, for instance in length-to-width ratio.

Literature have however argued that land fragmentation is common among small-scale farming. Small farm concept had been varied over time and by country. Agricultural economists have conceptualized the distinctions among farm sizes since the field's inception (Soltow, 1983). Small farm have described in some countries as farm size averages ranges between 0.5 to 2.5 ha, which has made it difficult to implement new production patterns or to utilize machinery and appropriate technologies. Re-allotment and amalgamation of plots is an important step to increase both productivity and efficiency in the agriculture sector. Traditional agricultural economy theory has

postulated the agricultural economic theory of small farms inefficient; a stance that began to be challenged in the 1950s. An overview of several working researches have indicated that the productivity of small farms often exceeded that of larger ones (World Bank, 1998).

There are also categories of marginal Farmer', this category of farmers cultivates often (as owner or tenant or share cropper) cultivating agricultural land up to 1 hectare (2.5 acres). On other hand, 'Small Farmer' cultivating (as owner or tenant or share cropper) agricultural land of not more than 1 hectare, hence, restrict small farms from expanding, due to this restriction, rural farmers are thus converge to subsistence form agriculture and cannot participate in commercial production. This thus has a significant effect and possibly explain while migration and the abandonment of farmland is common in sub-Saharan Africa (SSA). In the Nigeria, for instance, privately owned agricultural land is still to some extent incorporated into large user units (a heritage from the era of collective management) which prevent private landowners from using their own land for farming. At the same time, the situation is inhibiting land for market development, investment in large scale agricultural production.

Consequently land fragmentation has been seen as a problem and this is adduced in the following:

1. Distance between plots and the farmstead;
2. Many boundary lines;
3. Small size and irregular shape of plots; and
4. Lack of access.

In particular, when plots are spatially dispersed, travel time and hence costs in moving labour, machines etc. from one plots to another, get to increase are some of the significant factors influencing fragmentation (Bentley,1987).A consequent drawback is that plots at a greater distance are often cultivated less intensively (Van Dijk, 2003).

In addition, land fragmentation also involves a complicated boundary network among plots, hedges, stone walls, ditches, etc. which influences land wastages especially in smaller plots. This also has effect on the uncultivatedplots both at the smaller plots and marginal plots (Burton, 1988).

Moreover, the cost of fencing and neighbouring conflicts between landowners increases due to this problem. Furthermore, the small size and irregular shape of plots is another dominant problem associated with land fragmentation (Burton, 1988).Hence, this study wants to examine the relationship between small farms and land fragmentation among identified rural farmers in Ikole and Oye LG of Ekiti State, Nigeria.

Evidence abounds in past studies that Land fragmentation has been a major obstacle to agricultural development, because it hinders agricultural mechanization, causes inefficiencies in production, and involves large cost to alleviate its effects (Najafi, 2003;Thapa, 2007; Tan *et al.*, 2008).

The World Bank revealed that majority of the rural population produce 84 percent of agricultural value-added (World Bank, 2008). These products are from numerous small-scale farmers, who on the average, cultivate one hectare of land. Recent estimates indicated that though 55 percent of small household farmers have less than 1 hectare of cultivatable land, there are about 30,000 estates cultivating between 10 to 500 hectares, but their agricultural outputs compared to that of small holders who cultivated 1 hectare are insignificant (Olayiwola, L., M., and Adeleye, O. 2006). Studies have also indicated that these small holders' farmers cultivated multiple lands for agricultural purposes. This study therefore want to examines the likely effects when a small holder farmer cultivating more than one land for agricultural purposes and also to indicate this practices on income.

1.2 Problem Statement

Efficiency of smallholder farming practices in Ekiti State has generated a lot of arguments due to commonly practices of multiple use of lands by small-holder farmer. In addition, land fragmentation practices is evidenced in farm-specific and household-specific characteristics (such as education levels, dependency ratio, access to extension services, and possession of land titles among others), of small holders farmers (Agarwal, 1972).

Consequently, this study has a particular focus on the effects of land fragmentation on the farmer's outputs and income. Past and similar works have identified that most small farmers cultivates scatter intensive farms. It has been revealed that cultivated land in Ekiti State is still small compared to total agricultural land available in the State. This thus implies that land scarcity is not so extreme. There have been claims that land fragmentation results from extreme land scarcity and insufficiency of agricultural land (Niroula & Thapa, 2005).

The problem therefore is not that less land is allocated to crop production but the land allocated to crop production is not efficiently used due to practices of land fragmentation (Johnson, 1970). Studies have shown that small farms in Ekiti State have over the past been shrinking in sizes as land tenure problems and inheritance are still a

common practices in Ekiti and this has led to continuous subdivision of farms, leading to a fall in average farm sizes compared to National average (Oluwasola, 2008).

Hence, the study seeks to examine the following questions with the hope of providing answer to:

- a. What are the causes of land fragmentation in Ekiti State? and how do they affect land management using production units, minimizing effects and income
- b. What are the factors that influence household land plots at the production level in order to minimize the problem of land use management and improved the production efficiency?

1.3 Objectives of the study

The specific objectives are to:

- i. describe the socio-economic variables of respondents
- ii. examine farming plots available for agricultural purposes by respondents.
- iii. estimate causes and effects of fragmented farm land on farming operations.
- iv. determine factors influencing scattered/fragmented (individual) farm.

1.4 Justification of the study.

Study of the effects of land fragmentation on small holder's outputs and income has not been studied in Ekiti State. Hence, this study is important considering its magnitude and importance to examine the operation of fragmented land among small farm household. This to establish whether smallholder farms whose practices multiple lands for agricultural production are efficient and improves household income. It is equally justified that this study to identify the causes/sources of land fragmentation such that appropriate policies can be adopted to address the problem.

The findings of this study will suggest key factors that may enhance outputs from farms increases. This study will therefore captured plot size, distance from household residence to plots and number of plots per household in the analysis of the effect of land fragmentation on the productivity of small farm household in Ekiti State.

1.5 Limitation of the study.

There are several factors limiting this study, but the major factors are time and money. In addition, getting accurate information from small farmers has been a big problem because most of the farmers interviewed relied on memory recall and this could have great effect on the outcome of the analysis. Despite these challenges, the study tried to get required information that enabled the study to achieve the stated objectives and focus of the study not shifted.

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPT OF LAND FRAGMENTATION

McPherson (1982) argues that when a number of non-contiguous owned or leased farms (or 'plots') of land are farmed as a single production unit, land fragmentation exists. This means that the plots in a farm are spatially separate. Schultz (1964) defines 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 plots of land located far from one another. The paper indicated that the particular farm and other such farms will not be effectively managed as would be the case if the plots were reorganized and recombine in one farming area. Schultz sees land fragmentation as a source of inefficiency. Dovring et al. (1965) regards land fragmentation as the division of land into a great number of distinct plots, when he analyzes land reform in Europe. Also, the work of Papageorgiou (1956) emphasizes the role of distance in fragmentation. He notes that fragmentation means a holding consisting of several scattered plots over a wide area. Agarwal (1972), defines land fragmentation as a decrease in the average size of farm holdings; an increase in the scattering of each farmer's land; and a decrease in the size of the individual plots in a farm holding, while Binns (1950) sees fragmentation as a stage in the evolution of the agricultural holding in which a single

farm consists of numerous discrete plots, often scattered over a wide area. According to Binns' definition, land fragmentation represents a stage in agricultural holding's evolution. This suggests that if the holding is evolving towards consolidation, land fragmentation may be a temporary phenomenon.

Past studies have indicated that in many developing countries, key resource is land, particularly in the rural areas where they use this significant resource for livelihood activities. Due to traditional system of inheritance of land and property rights access to land for agricultural purposes is becoming difficult.

Literature have argued that inability of the small holder's farmers to have leasehold or free title on land made them to operate on two or more geographically separated expanses of land (Johnson, 1972; Barrows & Roth, 1990). Some studies have argued that this pushes most of these small holders to have fragmented land for agricultural purposes and thus affect efficiencies in production (Lyne & Nieuwoudt, 1991). Fragmentation result from land scarcity as farmers look beyond for whatever pieces of land may be available (Gebeyehu, 1995). Extant literature has expressed the concern of reknown scholars (Fabiya, 1984; Olayiwola and Adeleye, 2006) on the problems of traditional land tenure system in Nigeria. The expression of the scholars with respect to the problems of land tenure could be interpreted based on the duplicity of ownership of land with consequent excessive transaction costs, fragmentation of land

into uneconomic sized tracts, and inalienability of land which makes land part of the physical capital but not a part of financial capital. In Africa, land tenure system has generally been broadly described as rigid, creating obstacles in the way of development. Solutions to the land tenure system have involved the adoptions of some institutional changes such as the promulgation of legislation or the adoption of some revolutionary principles. In Nigeria, the intervention into the land problem involves the promulgation of the 1978 Land Use Act. The act has been designed to deal with several problems encountered by the various operative on land since colonial times. Past work on land fragmentation have argued that as population increases, the size of holdings fall, and are progressively fragmented into small plots, dispersed over a wide area, for residential purposes (Webster & Wilson, 1980). Evidence from the survey of Nigeria land tenure system revealed that the per capita land holdings of small farmers declined from 1.53 hectares in 1968 to 0.8 hectares per capita in 2010 (Olayiwola and Adeleye, 2006, NBS, 2014). However, these farmers play an important role for food security with an average farm size ranges between 0.7-2.2 hectares. Land fragmentation at the household level depends on external policy and market factors, agro-ecological conditions, and farm household characteristics. The resulting level of fragmentation, together with external factors, agro-ecological conditions and farm characteristics, affects agricultural production. In this study, we consider land fragmentation as a phenomenon existing in farm management. It exists

when a household operates a number of owned or rented non-contiguous plots at the same time (Wu et al, 2005; Daniel et al, 2010). Several studies in Nigeria have investigated the persistence of small farms, land fragmentation and small farms efficiency (Ikpi, 1989, Okunmadewa, 2002, Alimi, 2012, Austin et al, 2012). Most of these studies were conducted at the Local Government level or at the State level, and these studies are useful because they also helped in identifying the structure of land fragmentation at the local and state levels respectively. However, their application for policy formulation at the national level is limited due to small scope. This study however, uses national data, and will add to the already existing body of knowledge on agriculture and land fragmentation. Substantial studies that examined small farms in Nigeria have argued that agriculture is important in rural areas because of its role as the main source of income that employs relatively large households in farm operations (Alimi, 2012, Apata, et al, 2011). Reviewed of similar studies have indicated that accounting for the cause of land fragmentations among small farms is crucial, since most households in Nigeria has been identified as resource poor (Alimi, 2012, Apata et al, 2011). Therefore, knowledge on the problems of traditional land tenure systems and property rights on land in Nigeria and factors influencing increase in land fragmentation will help to formulate policies that can improve small holder's access to agricultural land. Consequently, this study deduced three distinct interpretations from the reviewed of literatures as follows:

1. Land fragmentation implies the subdivision of farm property into undersized units that are too small for rational cultivation;
2. This study suggests that the plots are non-contiguous and are intermixed with plots operated by other farming activities; and
3. Distance as an important aspect of land fragmentation.

2.2 WHEN IS FRAGMENTATION A PROBLEM?

Some people are concerned that more and more of our best soils are being subdivided and are used for housing rather than to produce food. Several studies have argued hinge migration of young Nigerians urban areas leaving agricultural activities to the aged in the rural areas. This has particularly affected family outputs and agricultural development. As more people move to urban areas, and housing development takes over land use in these areas, it places more pressure on our remaining productive land and thus leads to fragmentation. The consequence as follows:

- produce food on land not well suited to food production.
- produce more food from the smaller remaining areas of land suited to food production.

Causes of land fragmentation.

Even though the causes of land fragmentation may vary from country to country and from region to region, past studies indicated four main factors triggering this situation and they are: (Niroula and Thapa, 2005 and Bentley, 1987)

1. inheritance;
2. population growth;
3. land markets; and

4. Historical/cultural perspectives.

These studies argued that inheritance is the primary cause of land fragmentation. Inheritance laws applied in most countries facilitate or demand the subdivision of holdings into equal parts among all heirs or in some countries among only sons. This tradition has deep historical roots in old world countries' laws (e.g. the Napoleonic and Islamic inheritance laws) where the equal distribution of patrimony among heirs was a requirement (King and Burton, 1982). As a result, land fragmentation has become a continuous process with land holdings and land plots getting smaller and smaller as they have been dispersed to successive generations (Mearns and Sinha, 1999).

There is empirical evidence that inheritance is the prominent factor for land fragmentation in many places. This shows the strong relationship between inheritance and land fragmentation. Since land is a multi-purpose resource, land markets play an important role in the whole process of ownership restructuring, because people wish to acquire a piece of land not only for agricultural activities, but also for other reasons such as investments, enhancing personal prestige and status, and having secure current and future living conditions for the family. Grigg (1980) notes that acquiring land is among the most important aims of many people in different societies all over the world. In principle, land markets contribute to further fragmentation of the existing

holdings since, in most cases, farmers purchase land which is not continuous to their existing holdings or they (or other people) may purchase pieces of land as shares in other plots. However, in some cases, land purchase may reduce land fragmentation when farmers acquire neighborhood pieces of land to expand their holdings. Historical and cultural perspectives, which prevailed in old communities (such as in Europe), were inevitably the cause of land fragmentation. Some authors consider that the current problem of land fragmentation is a result of the historical legacy of an ancient field structure (Bentley, 1987). In those times, land fragmentation was adaptive to the prevailing conditions, i.e. small fields for acquiring a family's subsistence, manual or animal cultivation, cheap labour, small production, etc. However, these conditions are not well suited to current modern agricultural mechanization demands.

2.3 LAND FRAGMENTATION AND AGRICULTURAL PRODUCTIVITY

Although land fragmentation may be generally considered as the fundamental rural spatial problem due to many disadvantages and its impacts, it is not a problem by definition in all cases because it can also be beneficial. In particular, the most prominent disadvantage is the increase of economic costs because it hinders mechanization, causes inefficiencies in production and involves large costs to alleviate its effects (Karouzis,1971). As a result, agricultural productivity and hence income are reduced (Karouzis, 1971). It is found that farmers need to travel long distance annually to visit their scattered plots. Another economic drawback is that fragmentation limits the desire of a farmer to modernize or rationalize his/her holding by introducing new agricultural techniques such as machinery, irrigation systems and fencing while also prevent the introduction of new crops, disease controls, etc (Karouzis, 1971).This is due to small size of the plots; a remarkable statistic is that a tractor may spend up to one third of its time turning round on a one hectare plots (Naylon,1959).In addition to the economic impacts, King and Burton (1988), support the view that fragmentation may have social and psychological impacts with consequently wider repercussions across the agricultural sector or within a certain community as a whole. More specifically, an organized land tenure structure in a rural community may raise the status of certain farmers and improve communication and cooperation among them.

Also, it may reduce inequalities among farmers which have less agricultural problems due to fragmentation.

King and Burton (1982) also emphasize the social tension caused by disputes over ownership, especially in the case of shared and multiple ownerships. As a result, litigation sometimes leads to serious conflicts and court settlement. While most studies tend to focus on the negative impacts of land fragmentation in agriculture, sometimes land fragmentation offers benefits and sometimes may be desirable or even necessary (King and Burton, 1982).

Literature concentrates on three main benefits: risk management; crop scheduling; and ecological variety. In particular, risk management may minimize the potential risk due to climatic and natural disasters (e.g. storms, frosts, fire, floods, etc.) because risk it is spread spatially (Van Hung, MacAulay and Marsh, 2007), (Jian-Ming, 1997). In addition, risk management involves the logical reduction of risk by giving a farmer a variety of soils, crops and growing conditions, by virtue of the spatial dispersion of plots (Van Hung, MacAulay and Marsh, 2007). In addition, crop scheduling may be favored when plots are scattered between various locations at different altitudes because crops ripen at different times. Thus, a farmer may adjust his labour force according to a schedule so as to avoid labor bottlenecks. Also, crop scheduling is possible since crops ripen at different times; a household with scattered plots may

harvest all of its farm produce without extra labour (Galt,1979).The advantage of crop scheduling is not limited to mountainous areas; example indicates that crop scheduling has allowed farmers in Ekiti State to maximize their self-employment and minimize the amount of hired labor needed (Fenoaltea,1976). Furthermore, fragmentation may also offer ecological benefits by formulating a natural mosaic of plots shapes and crops. In contrast, regular plots shapes, especially in semi-mountainous and mountainous areas are not so harmonious with the landscape and they may create a 'foreign' aesthetic value. In addition, small plots are less exposed to winds and hence to crop diseases and to soil erosion. Moreover, some non-economic and social benefits of fragmentation are offered by the fact that scattered farms will be distributed more easily to the heirs of a holding. Cooperative farming involves the joint cultivation of land by a group of households. It served as an effective solution to land fragmentation, through the creation of economically operational farm units. However, according to Niroula and Thapa (2005), the practical experience has shown negative results, mainly because of the reluctance of landowners to participate in these programs. Reluctance is due to conflicting interests and perceptions among landowners and the fear of losing their rights. As a result, the whole attempt has collapsed. Similarly, land fragmentation can be adaptive under certain conditions, recognize that this phenomenon will gradually become non-adaptive as technology improves and the relevant costs change (Johnson, 1970 and McCloskey, 1975). Anthropologists, also points out that land

fragmentation as a positive situation under which farmers can cultivate many environmental zones, minimize production risk and optimize the schedule for cropping activities. Many environmentalists consider that any intervention to land tenure structure to remove land fragmentation may have serious environmental effects in nature and even social effects on landowners. Those ethnographers who have referred to land fragmentation consider it neither a problem nor an adaptation. These contrary views are not unreasonable since numerous studies showed contrary results. For instance, Karouzis (1977) and Blaikie and Sadeque (2000) argue that land fragmentation is a serious constraint preventing productivity while some authors (Wan, 2001 and Wu, 2005) support the view that land fragmentation has not had negative effects on productivity.

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA.

Ekiti State, Nigeria was created on 6 July 1996 from the former old Ondo State. The State current poverty level is 45.7% and unemployment rate of 12.5% (NBS, 2012). The present Ekiti state has been regarded as landlocked areas and land fragmentation has been seriously influenced. The state is made up of 16 Local Government Areas, with Ado-Ekiti as the state capital. The state lies entirely in the tropics. Ekiti is bounded in the North by Kogi States; in the East by Ondo State; in the West by Oyo and Ogun States. The land area is 14,788,723 Square Kilometers (km²) with a population of 3,441,024 comprising 1,761,263 males and 1,679,761 Females. The study areas of this research are both Ikole and Oye Local government of Ekiti State. Ikole and Oye Local Government are predominantly a homogenous society which is carefully populated by Yoruba speaking people of the South West Zone of Nigeria. The Religious of the people are mainly Christian and Islamic religious while a percentage of the people are Traditional religion worshippers. It is observed that agricultural practices and Timber/Saw mills are the thriving industries. Geographically, Ikole Local Government is entirely within the tropic, which is located between longitude 45⁰ East of Greenwich and latitude 7⁰– 8⁰ – 15⁰North of the

Equator. Its neighbors' are Kwara State to the North, Kogi State to the North east, Ekiti East to the East, Gboyin Local Government in the South and Oye Local government in the West. The headquarters of the local government, Ikole- Ekiti is about 22.5 kilometers from Ado – Ekiti, (Ekiti State capital). The local government is mainly on the upland zone rising to about 250 meters above the sea level. The geographical location of Oye Local Government is between latitude of 7.8°N and longitude 5.3°E . Oye Local Government is bounded by Ilejemeje Local Government to the North, Irepodun/Ifelodun to the South, Ikole local Government to the East and Ido/Osi Local Government to the West. It comprises the following towns and villages: Oye-Ekiti, Ilupeju-Ekiti, Ayegbaju-Ekiti, Ire-Ekiti, Itapa-Ekiti, Osin-Ekiti, Ayede-Ekiti, Itaji-Ekiti, Imojo-Ekiti, and a host of others

3.2 SAMPLING TECHNIQUE AND DATA COLLECTION.

A multi-stage stratified random sampling technique was employed for data collection. In the first stage of the sampling process, the Agricultural Development Project (ADP) Zone of Ekiti Central zone was considered. In the second stage, two local governments were selected on the basis of indices of land fragmentation through past studies. In the third stage, two towns were selected from each local government and in the final selection; fifty farmers were randomly selected from identified farmers who had participated ADP work. The final analyses of data collection were shown on Table 1.

Table 1: Distribution of Sample size and collection;

Zone	Local Government	Town	Questionnaire Distributed	Questionnaire Returned
ADP Central	Ikole	OkeIjebu	25	22
		Odo-oro	25	18
	Oye	Osin	25	23
		Ilupeju	25	17

Source: Field survey, 2016

Analysis on Table 1 revealed that 25 questionnaire were distributed across the towns to give a total of 100. Eighty questionnaires were returned (to give a 75.0% response rate) and were used for subsequent analysis. The 20 questionnaires that were not used comprises unreturned questionnaire, missing information in the questionnaire and incomplete data in the questionnaire.

The selections of sampled farmers were accomplished in the final stage of sampling process. Farmer's selection included two steps: the first was to select farmers that have multiple farms and secondly, based on the farmer's list obtained from identified sources in the selected towns.

3.3 ANALYTICAL PROCEDURE

In order to examine the determinants of land fragmentation among farming households in the identified study areas, income status of household was regressed against selected variables.

The Model is expressed as:

$$Y = f(X_1, X_2, X_3, \dots, X_8, \mu_i)$$

The estimating equation is represented as:

$$Y_i = \alpha + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots, \beta_{12} X_{12} + \mu \dots \dots \dots (1)$$

Where Y_i = Income status of household

α = Constant

β_0 = Coefficients

$X_1 - X_{12}$ = Independent variables.

U = Error term assumed to have normal distribution with zero mean,

and constant variance i.e $U \sim N(0, \sigma^2)$ and $E(U_i, U_j) = 0$ if $i \neq j$.

The following variables are hypothesized as having significant influence on the income status of households: Age (X_1), Gender/Sex (X_2), Marital Status (X_3), Family size (X_4), Years of Schooling (X_5), farming experience (X_6), Acquisition of present farm (X_7), No of land use for agricultural purposes (X_8), Agricultural Practises (X_9), Sources of farm finances (X_{10}), Sources of Credit (X_{11}) and Cost of farming inputs (X_{12}). The selection of these variables was based on economic theory and suggestions of previous/similar studies. The OLS technique was used to estimate the model.

3.4 DESCRIPTION OF THE VARIABLES

Table 2: Description of variables used in the Multiple Regression Model

Variable name	Variable type	Variable Description
Demographics		
Age	Continuous	Age of household head (in years)
Gender	Binary	Gender of household head (1= Female, 0 – Male)
Marital Status	Binary	Married =1, Single = 2, Widowhood = 3 and Separated = 4
Family size	Continuous	Family size in numbers
Years of Schooling	Continuous	In years
Farming experience	Continuous	In years
Acquisition of present farm	Continuous	In years
No of land use for agricultural purposes	Continuous	Number
Agricultural Practices	Continuous	Number
Sources of farm finances	Continuous	Number
Sources of Credit	Continuous	Number
Socio-economics		
Income	Continuous	Household annual income (in 1000 Naira)
Farm size	Continuous	Farm size (measures in acres)

Source: Field survey, 2016

A structured questionnaire was used to elicit relevant information, such as age, gender, household size, which were used in the multiple regression model to identify key household-level factors that influence multiple farming among rural populations. In addition, the questionnaire that were gathered contained qualitative information, such as knowledge of the factors that influencing use of multiple land for farming.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 DESCRIPTION OF SOCIO-ECONOMICS VARIABLES

Age distribution of household heads

Literature have shown that Nigeria's economy is predominantly agricultural, which implies that a large proportion of the populace derive their livelihoods from crop production, fishing and forestry. Consequently, there is need to review the age range which can cope with this labour-intensive and drudgery associated with crop production, fishery and forestry production. The economy of Ekiti State of Nigeria is predominantly agricultural. This implies that a large number of the populace derived their livelihoods from agricultural and related activities. This draws attention to the need for the age range, which can cope with the labour-demanding nature of agricultural production activities. Table 3 shows the age distributions of household's heads.

Table 3: Age distribution of Household heads

Age group	Frequency	Percentages (%)
20 -30	2	2.5
31 – 40	15	18.8
41 – 50	34	42.5
51 – 60	20	25
Above 60	9	11.2
Total	80	

Source: Field survey, 2016

Result from Table 3 shows that the modal age range is 41-50 years. An average household head was 47.7 with standard deviation of 8.67 and active age group of 41-50 years constitutes 42.5% of the respondents. This suggests that the population is fairly ageing and cannot contribute productively to agricultural productions. Hence, there is an urgent need to encourage young people particularly those in their active age group participate in agricultural and related activities.

Years of Schooling of household heads

Education is vital for boosting the productivity of the human factor of production and making people more aware of opportunities for earning a living. It has been found that a one-year increase in the average length of schooling could push up GDP by 3% (Grootaert, 1997). The income of a household is a function of the number of persons working in the household and sometimes the level of educational attainment (Scherr, 1999).

Therefore, the level of education in the study area varied from primary to secondary and tertiary institutions. Thus, the number of years spent in school varies from 6-15 years.

Table 4. Therefore, describes the distribution of household heads by the highest years of educational attainment.

Table 4: Years of educational attainment of household heads.

Educational attainment	Frequency	Cumulative
No formal education	7	8.8
Primary school	13	16.2
Secondary school	11	13.8
Post-secondary school	30	37.5
University	19	23.8
Total	80	

Source: Field survey, 2016

Result from Table 4 shows that those that had post-secondary education are in modal class of 37.5%. This suggests a fairly literate populace. The higher the educational level, the more the individual is expected to recognize opportunities for earning a living. Also, this can help in determining the types of non-farm livelihood sources to be engaged into to increase household income. The educational status reveals that the majority of the respondents (about 60%) had secondary education and above. This

suggests that most households' heads will recognize opportunities for earning an extra income for the household upkeep.

This evidence tends to confirm the argument that there is a link between educational attainment, the income earning potential of the household and poverty as asserted by Okurut *et al* (2002). Education attainment of the household heads revealed a fairly literate population. This finding thus suggests that dissemination of new ideas and methods can easily be disseminated and received. Thus, there is a need for adequate and more representation of extension personnel in the area of study

Distribution of family size and sex of household heads.

The size of household could provide important information on the income generation, livelihood diversification and land fragmentation because of its possible correlation with poverty status. Evidence abound pointing to the fact that poor people tend to live in large-size households while non-poor tend to live in small-size households (Grootaert, 1997; Ellis, 1998). The impact of large family size is such that it reduces the per capita expenditure of the family thereby aggravating poverty in the household.

The distribution of the family by size is shown below:

Table 5: Family size grouping* Gender Cross tabulation

	Gender			
		Male	Female	Total
Family size grouping	1-3	3	4	7
	4-6	11	14	25
	7-10	8	18	26
	11-15	11	2	13
	16-20	9	0	9
Total		42	38	80

Field Survey: August, 2016

The result from Table 5 shows that about 60.0% of the households fall between household sizes 4-10 with mean of 8.36. This outcome is large enough to attract high dependency burden in terms of many mouths to feed. Even though family size tends to reduce per capita expenditure, it can also enhance it. This has to do with the distribution of household between adult and children and also whether such adult is working, thereby supplementing the household income or is a dependent. The

implication of this finding is that the higher the dependency burdens the more the household consumed farm outputs? Thus, reduces marketable farm outputs sold, reducing household income and gravitates towards poverty status, and vice versa. This has to do with the distribution of household between adult and children and also whether such adult is working, thereby supplementing the household income or is a dependant.

Sex and Marital Status of Respondents

It is a known fact that gender relations largely determine household security, provisions as well as poverty status (Ellis, 1998). It is shown from Table 6 that 84.0% are married while the remaining 12.5. % is widowed or divorced/separated. This implies that there exist a mutual benefits derived in working together as husband and wife, where risks are spread, better decision- making opportunity and larger pool of resources existed for the enhancement of the family. This will, as a matter of fact affects their level of living, provisions to meet household's basic needs and poverty status.

Table 6: Marital Status* Gender Cross tabulation

	Gender		
	Male	Female	Total
Married	35	33	68
Single	2	0	2
Divorced	2	3	5
Separated	3	2	5
Total	42	38	80

Field Survey: August, 2016

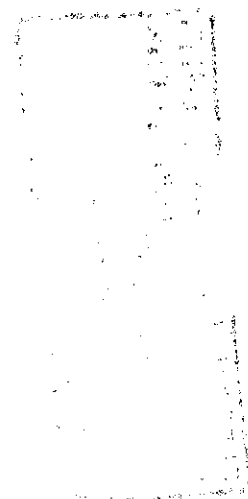


Table 7: Income earning grouping * Farm size grouping Cross tabulation

		Farm size grouping				
		1-2	3-4	5-6	7-8	Total
Income earning grouping	1-10000	3	1	1	0	5
	10001-20000	2	1	0	2	5
	20001-30000	1	6	0	1	8
	30001-40000	3	3	0	0	6
	40001-50000	0	4	3	1	8
	50001-100000	5	6	6	4	21
	100001-1000000	7	4	6	3	20
Total		21	25	16	11	73

Field Survey: August, 2016

Table 7 presents the causal relationship between income earned amount and farm size. Literature have documented that the higher the income obtained, the propensity to increase farm size too will be high. Table 7 results indicated that those farmers in the lower category of farm size had higher income. Moreover, farmers that have 4 acres of farmland or lower sought to make more revenue those farmers with higher farm size. This study thus confirms that small farms efficiency.

Land fragmentation

Literature have documented that multiple use of land has been generally influenced by availability of land for agricultural purposes, proximity of the land to market and farm inputs, financial gains and demand. Table 8 revealed that farmers that had 2 and 3 multiple land for farming are the majority (78.7%). The study also discovered that why the persistence of land fragmentation, the result revealed that the old farm is becoming smaller, rented farm and owner want it back, can no longer pay rent on the farm, Problem of soil fertility and incessant conflict among the community and herdsmen.

Table 8: How many of such land do you use for agricultural purposes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	6.2	6.2	6.2
	2	45	56.2	56.2	62.5
	3	18	22.5	22.5	85
	4	12	15	15	100
	Total	80	100	100	

Source: Filed survey, 2016.

Table 9 revealed the income earning potential of farmers in the areas of study and experience of farming over the years. The results here revealed that are more experienced had the modest income. This study thus confirmed the findings of Somilleda, 2010, Mariara and Kiriti, 2002 and Scherr, 1999 that experienced counts in the income earning potentials of farming.

Table 9: Income earning grouping * Farming experience grouping Cross tabulation

		Farming experience grouping						Total
		1-5	6-10	11-20	21-30	31-40	41-50	
Income earning grouping	1-10000	0	0	3	0	0	2	5
	10001-20000	0	0	2	3	0	0	5
	20001-30000	0	3	1	4	0	0	8
	30001-40000	2	2	2	0	0	0	6
	40001-50000	0	3	0	2	0	3	8
	50001-100000	0	2	11	2	6	0	21
	100001- 1000000	0	2	6	7	3	2	20
Total		2	12	25	18	9	7	73

Source: Field Survey, 2011

Table 10: Used credit for * Amount of credit obtain Crosstabulation

		Amount of credit obtain				
		Less than N10,000	N10,000 - N20,000	N20,001 - N50,000	Above N50,000	Total
Used credit for	Land preparation	0	17	8	8	33
	Purchases of improved seeds	0	16	8	9	33
	Purchased of herbicides' and pesticides	9	0	8	0	17
	Farm maintenance	0	9	8	0	17
Total		9	42	32	17	100

Source: Field Survey, 2016

Evidence from Table 10 indicated that 33% of the loans were used for land preparation and purchased of improved seeds. Results from Table 10 also revealed that 44% of the farmers got loan from Cooperatives to meet farms operations obligation. Moreover, results from Table 10 on amount apportioned to each farming activity. Results indicated that 9% of the farmers indicated that less than N10, 000 were used for their farming activities, while 42% of the farmers said that between N10,000 and N20,000 were used for their farming operations respectively (Table 10).Income is a determinant of household expenditure since it serves as the budget constraint to the amount that can be spent within a period, there is also bound to be correlation between income, educational attainment and poverty level of a household, all other things being equal (Mariara and Kiriti, 2002). Table 11

Table 11: Income earning grouping

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-10000	5	6.2	6.8	6.8
	10001-20000	5	6.2	6.8	13.7
	20001-30000	8	10	11	24.7
	30001-40000	6	7.5	8.2	32.9
	40001-50000	8	10	11	43.8
	50001-100000	21	26.2	28.8	72.6
	100001- 1000000	20	25	27.4	100
	Total	73	91.2	100	
Missing	System	7	8.8		
Total		80	100		

Field Survey: August, 2016

To examine factors influencing land fragmentation among farming households.

Table12: Multiple regression estimates for farmers' accessibility to multiple uses of land.

Independent variables	Estimated coefficients	Standard Error	Marginal effect
Constant	3.6876	1.4357	
Age	0.0103	0.0191	0.0011
Sex	-0.31	0.3288	0.0437
Family size	-0.2262	0.1356	-0.0236*
Years of education	1.1641	0.6811	0.1797*
Farm size	0.701	0.4375	0.0548
Farming experience	0.5363	0.2255	0.0558**
Acquisition of present farm	-1.4565	0.4477	-0.0392
Multiple uses of land	-0.2071	0.3162	-0.023
Sources of credit	1.0056	0.4291	0.4267
Agricultural practises	-1.4808	0.5525	-0.2495***
Sources of finance	-1.105	0.3046	-0.1676***
Cost of farming inputs	1.6093	0.0317	0.0197***

Source: Field Survey, 2016

Dependent variable = Income. Marginal effect is at the mean value. * 10% significant level.

** 5% significant level. *** 1% significant level. R-squared $R^2 = 0.4382$

DW: 1.77

The multiple regression model was conducted to investigate factors that influence farmers' multiple uses of land for agricultural purposes and estimated via ordinary least square method estimation technique. Table 12 presents the estimated results of the logistic model.

Overall the multiple regression model successfully predicts the possibility of households' embarking on land fragmentation (43.82%). This suggests that 43 per cent of the explanatory variables explained the dependent variables (that is engaging in land fragmentation), while the remaining 56.18% remained unexplained. This is a research for future to consider factors influencing the unexplained variables. Based on the estimated results, 6 variables are found to have significant influence on farmers' multiple uses of land for agricultural purposes and these are family size, years of education, farming experience, agricultural practices, and sources of finance and cost of farming inputs respectively. The significant positive signs on years of education and farming experience variables can be explained from the perspective of capital requirement. Fairly literate farmers tend to have more investment opportunities,

leading to stronger potential need for worthwhile adoption of credible and effective farming operations. In addition, this category of farmers may also be more confident in increasing income as they cultivate more lands for agricultural purposes. Therefore, they are more inclined to land fragmentation.

This relationship is expected because farmers with formal education (for example, secondary or post-secondary school) are likely to have more exposure to the external environment including risks and possess more skills. They therefore might require more income earning potentials for improving farm sizes and/or production, compared to uneducated farmers. In contrast, a significant but negative relationship is found between variable family size and farmers' accessibility to land for agricultural purposes, suggesting that the larger-size households are less likely to engage in land fragmentation. This is possibly because larger-size households tend to more hands for labour activities on such various land for agricultural purposes.

The estimated coefficients of variables agricultural practices and sources of credit are all negative and significantly different from zero at the one per cent level. Holding other factors constant, form of agricultural practices adopted have a significantly lower probability to improve income compared to those that adopted effective land management practices and good management programme in their farming operations. In addition, sources of credit could decrease the likelihood of engaging in land

fragmentation, this is because most credit were sourced from friends and family, fund from these sources were inadequate and untimely thus making used of credit not effective. Furthermore, the availability of other credit sources (such as informal credit) also tends to reduce the probability of engaging in effective uses of land for agricultural purposes.

Finally, the estimated coefficient of cost of farming inputs is positive, implying that the farmers that uses relevant and timely farming operation and also adopting good management programme in farming are likely to generate more income. One possible explanation for this unexpected relationship is that households with higher family size and dependency ratios have fewer family members taking up income-generating activities and thus are more inclined to rely on loans for household activities such as consumption and children's education due to insufficient income.

The marginal effects are also calculated for the regressors of the multiple regression model to provide a direct economic interpretation on the influence of these variables on income. The results are also summarized in Table 12. For example, the marginal effect of family size indicates that an additional member increase in the family would decrease the probability of land fragmentation by 2.36% on average. In addition, the probability of engaging in effective agricultural practices would increase by 0.55% with every 1% increase in dependant ratio.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Literature have documented that multiple use of land has been generally influenced by availability of land for agricultural purposes, proximity of the land to market and farm inputs, financial gains and demand. Table 8 revealed that farmers that had 2 and 3 multiple land for farming are the majority (78.7%). The study also discovered that why the persistence of land fragmentation, the result revealed that the old farm is becoming smaller, owner of rented farms want it back, in addition most farmers that rent land for farming purposes could no longer pay for the rent on the farm. There are also the problem of soil fertility and incessant conflict among the community and herdsmen.

The empirical analysis based on multiple regression established six Farmer-level factors important in affecting households' likelihood to engaging in land fragmentation. Family size, years of education, farming experience, agricultural practices, and sources of finance and cost of farming inputs respectively. Years of education are one of the important contributors to farmers' accessibility to the use of multiple lands for agricultural activities. Conversely, family/households with large

family size would be less likely allows household head to engage in multiple land for agricultural purposes and hence affected income.

The multiple regression model was conducted to investigate factors that influence farmers' multiple uses of land for agricultural purposes and estimated via ordinary least square method estimation technique. Table 12 presents the estimated results of the logistic model. Overall the multiple regression model successfully predicts the possibility of households' embarking on land fragmentation (43.82%). This suggests that 43 per cent of the explanatory variables explained the dependent variables (that is engaging in land fragmentation), while the remaining 56.18% remained unexplained.

Income is a determinant of household expenditure since it serves as the budget constraint to the amount that can be spent within a period, there is also bound to be correlation between income, educational attainment and poverty level of a household, all other things being equal (Mariara and Kiriti, 2002)

5.2 CONCLUSION

Land was created by God, but the existence of man had led to the division of land. Land is a natural resources whose supply is inherently fixed. It comprises of all particular geographical locations, mineral deposits, forest, fish stocks, atmospheric quality, geostationary orbits and portions of the electromagnetic spectrum, natural resources are fundamental to the production of all goods including capital goods. The study found out that there are four types of land fragmentation practises in the study areas and these are land ownership, land-use, within farm, and lastly separation of ownership and use.

A multi-stage stratified random sampling technique was employed to collect data from 100 respondents out of which 80 data were useful for subsequent analysis. Information was collected through structured questionnaire on respondents' socio-economic variables and other factors influencing land fragmentation and farming outputs. Results revealed that the modal age range of the respondents is 41-50 years. Mean household head age is 48 years with standard deviation of 8.67. Majority of the respondents had post-secondary education are in modal class of 37.5%. Results also indicate that 60.0% of the respondents fall between house hold sizes 4-10 with mean of 8.36.

The results also revealed that in the lower category of farm size had higher incomes. Farmers that had 2 and 3 multiple lands for farming are in the majority (78.7%). Thus, this evidence revealed that fragmentation had effect of small farms outputs and income. The small farmers that had multiple farms had a higher income. Multiple regression results revealed that six farmer-level factors are significant variables in influencing land fragmentation. Years of education are one of the important variable influencing farmers' accessibility to the use of multiple lands for agricultural activities.

Thus, land fragmentation has been a blessing in disguise to most of the farmers as the study found out that farmers that practices multiple plots for farming has higher income than those who cultivated a single plot. The study concludes that land fragmentation has thus has effects on farming outputs and income. It was however discovered that land fragmentation limiting land expansion and investment and not encouraging commercial agriculture. Most of the farmers that practices land fragmentation as a system of farming does so on subsistence level.

5.3 RECOMMENDATON

Based on the finding of this study, the following recommendations are made;

- Government should formulate and implement economically viable land reforms policy to ensure that farmers feel emotionally attached to the land they cultivate.
- Participation in the cooperative farming has been identified as a good source of fund for small famers and thus should be encouraged.
- Establishment of specific land protection policies/program to prevent agricultural land from beingdeveloped for housing or commercial use as a matter of policy by government should be put in place.

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APPENDIX

QUESTIONNAIRE

FEDERAL UNIVERSITY, OYE-EKITI, EKITI STATE NIGERIA, DEPARTMENT
OF AGRICULTURAL ECONOMICS AND EXTENSION.

RESEARCH QUESTION FOR FARMERS

**TOPIC: EFFECT OF LAND FRAGMENTATION ON FARMING INCOME IN
EKITI STATE, EVIDENCE FROM OYE AND IKOLE LG.**

NOTE: This question is designed to obtain information for academic research
purpose. It will be appreciated if the under listed question are answered honestly and to
the best of our knowledge.

INSTRUCTION: Please tick appropriate.

SECTION A (Socio-economic characteristics)

1. Age
2. Gender? (a) male (b) female
3. Marital status:
(a) Married () (b) single () (c) Divorced () (d) Separated ()
4. Family size?

- I. No of wives.....
- II. No of children.....
- III. No of dependent.....
- Total =

5. Highest level of education attained?

- (a) No formal education () (b) Primary education ()
- (c) Secondary education () (d) Post-secondary education ()
- (e) Tertiary education ()

6. Year of schooling-----

7. What was your aim of agric. Production/Fishing activities (check one)

- a. To feed my family and myself
- b. To feed my family and myself and if possible have some for sale
- c. To exchange excess products for other goods
- d. To make profit through farming/fishing
- e. To have large surpluses for sale and make huge profit.

8. A] Farming experience.....years

B] How long have been working on your present farmyears