LAND TENURE REFORMS AND INVESTMENT IN TANZANIA

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M.A. (Economics) Dissertation

University of Dar es Salaam

September, 2013

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By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Arts (Economics) of the University of Dar es Salaam

University of Dar es Salaam

September, 2013

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for the acceptance by the University of Dar es Salaam a dissertation entitled: ***Land Tenure Reforms and Investment in Tanzania***, in partial fulfillment for the degree of Masters of Arts (Economics) of the University of Dar es Salaam.

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Dr. Razack B. Lokina

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Date: ……..

DECLARATION

AND

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I, **Sylivester Suzana**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……..

ACKNOWLEDGEMENT

I would like to give my special thanks to Almighty God for the Gift of life. My study has been successful by his Grace "***I will glorify his name***"

This study could not have been written without the help of so many people and institutions, beginning with the UDSM-Sida Natural Resources and Governance Program, Department of Economics and EFD-Tanzania for their financial support.

This work owes a serious debt of gratitude to Dr. Razack B. Lokina who supervised me with great support. He was firm, critical and patient in our numerous discussions. Again, I am indebted to Prof. Adolf Mkenda who is the head of department for his numerous support to my studies, Dr. John K. Mduma, Dr. Aloyce Hepelwa and Mr. Hussein Nassoro for their technical support specifically on the issue of data. Special thanks to Prof Mabele for his advice, basic ideas on the issues of land and tireless readings.

My fellow students also deserve special mention; thanks to all classmates especially, Dominic, Deogratius, Josephine, Edna, Samwel, Livin and Dorica. Never will I forget your advice and encouragement; you made my study the happiest one.

More than that, I would like to express my heartfelt gratitude to my Father Mr. Sylivester Genes Assenga for his support right from the beginning I started the MA (Economics) programme; to my mother Suzan (Mahawa) Kissela for her prayers and advice which made me achieve what I am today. Juliana, Jovin, Jovius, and Justa also deserve a special

mention. Special thanks to Cuthbert for his support and advice that made my study the happiest one.

Finally, I would like to thank everyone who in one way or another has made my live meaningful through sincere advices, encouragement, prayers and moral supports. Just to mention few, Mr. Malima Nkilijiwando, Martin Kissela, Fabiana Benedict, Fredrica Massawe, Christopher Costantine, Mr. Otieno Ossoro, and Dr. Jehovaess Aikael. I have nothing to repay you but always I will remember you in my prayers, May the Lord bless you all.

DEDICATION

This thesis is dedicated to my Family; Mr and Mrs. Sylivester Genes Assenga, my young brother Jovin, and my young sisters (Juliana, Jovias and Justa) for always they have been providing me with great moral support and prayers.

ABSTRACT

Using cross sectional data obtained from the first wave of the National Panel Survey Data; this study attempts to examine empirically two issues; first the influence of land tenure reforms on sustainability of land management; second, the influence of land tenure on land investment (trees plantation). The econometric analysis of the study indicates that probability of planting trees increases with ownership of land implying that if someone owns land increases the incentive for planting trees because farmers are able to realize the benefits of trees from plantations that occur over time. The analysis further shows that, it is not only land ownership that influences the probability of planting trees but also other factors (such as distance from plot to home/market; slope of the plot; and organic fertilizers as well as pesticide) which implies that issues of land investment for sustainable land management have to consider both factors for it to have meaningful impacts.

The study suggest that, major changes in land conservation investments will require attention to all these factors because no single factor can be used as a major factor to influence policy instruments. In this sense all factors (land ownership, characteristics of the plot like slope and distance where the plot is located, and also agriculture inputs like fertilizers and pesticide) have to be taken into account for land conservation investment and sustainable land management.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

C.A.S.L.E	Conference on Sustainable Land Management in Africa
CRDB	Co-operative and Rural Development Bank
DFID	Department for International Development
DILAPS	Dar es Salaam Institute of Land Administration and Policy Studies
GDP	Gross Domestic Product
MAFSC	Ministry of Agriculture Food Security and Cooperatives
NDCA	National Development and Credit Agency
NPL	National Land Policy
NPS	National Panel Survey Data
PSRC	Parastatal Sector Reform Commission
TIC	Tanzania Investment Centre
TRDB	Tanzania Rural Development Bank
URT	United Republic of Tanzania

CHAPTER ONE

INTRODUCTION

1.1 Background

Literature has shown that increased tenure security is expected to enhance the productivity of farmers through the intensification effect, which reflects the effects of land tenure security on the incentives to invest, particularly in capital goods attached to land (See Feder et al. (1988). This has been shown to operate by three mechanisms; first, if the farmer believes that he/she will be allowed to reap the long-term benefits of current investments, investment levels are likely to increase relative to a situation where there is tenure insecurity. Secondly, tenure security can increase farming productivity through an increased allocative efficiency, which reduces the problem of lack of credit faced by farmers with tenure insecurity. Thirdly, with limited access to credit, farmers allocate inputs under quantitative constraints (Besley, 1995). With secure tenure as collateral, these constraints are eliminated and farmers can borrow freely to increase their application of inputs to profit- maximizing levels.

Again, it has been indicated that improper land use leads to erosion and deteriorating land quality and leads to rural productivity remaining at low levels. To overcome this problem, DFID (2004) proposed that, for any agricultural transformation efforts to overcome land fragmentation have to deal with land reforms, using both “redistributive” reforms, and

"land tenure" reforms to make sure that the population (both men and women) enjoy the same rights on land, to improve the value of the land, to promote investment, to reduce abject poverty and to contribute to sustainable land use and management.

According to DFID (2004), land reform entails redistribution of land, remodelling of land rights and improvement of land administration in a manner that 'fits' the requirements of the political system promoting the reform. To make land reforms initiatives more influential to various economic agents, it has to be divided into some actions. First, actions involving direct land redistribution for productive use, this sometimes is refered to as 'redistributive' land reform, which can include the restoration of land to the dispossessed. Generally this is taken to mean the redistribution of property rights in land for the benefit of the landless, poor tenants and farm labourers.

Second, land policy reforms that strengthen tenure security, will influence what other options are available for policy and legal change that will contribute to tenure security, improve access to land and natural resources and play a part in poverty reduction, on-farm investment and employment creation. This is especially relevant in sub-Saharan Africa, where land is central to economic and social development and land-based livelihoods contribute a major share of Gross Domestic Product (GDP).

Land ownership related to investment in both rural and urban areas has been a major concern in Tanzania and elsewhere in developing countries, thus, efforts have been done to improve land tenure for investment and sustainable land management (HAKIARDHI 2005).

The development of land ownership in Tanzania passed through a number of historical stages which include pre-colonial era, colonial era, independence and new land order era. The pre-colonial era is sometimes known as customary tenure regime in which Land was owned customarily. During this era, Land administration and conflict management was the role of the elders who were also custodians of the customs.

During colonialism Land was the primary target of colonial powers for it produced the required raw materials like crops, minerals, wildlife, and forest products. During German rule, land belonged to King Kaizer as per 1895 imperial decree. The British passed a land ordinance number 3 of 1923 establishing a title deed system with prominence over customary tenure.

During independence era the 1923 ordinance did not change much. The only notable change made, was the replacement of the word governor with President. Land became public but vested on the President on behalf of all the citizens. Act No. 47 of 1967 was enacted to provide for procedures and reinforce the presidential powers on land acquisition. However, the new land acts No.4 and 5 of 1999 have retained this but with improvements on the compensation package (HAKIARDHI 2011).

Despite of the land tenure reforms that have been done in Tanzania, long term investment for sustainable land management is low compared to other sector. Thus this study seeks to investigate the influence of land tenure reforms on land investment and sustainable land management.

1.2 Statement of the Problem

Land is a critical resource for any agrarian economy whose members are dependent mainly on crop production for their survival. It serves as a basic factor in the cultivation of crops and is the main source of pasture for domestic animals. As a result, the capability of individual households as producing units depends, to a large extent, on their access to land as well as rights they have with regard to land ownership. Hence, with well-defined land tenure security individuals are able to undertake measures that will conserve land for better agricultural productivity.

Again, it has been argued that, many environmental problems such as soil degradation and forest depletion can be characterized as the result of incomplete, inconsistent, or non-enforced property rights. This indicates that, complete, consistence and well enforced ownership (property rights) on natural resources such as land is one of the incentives to conserve them.

Despite of the land tenure reforms that have been undertaken in Tanzania, most people in rural areas are still using land as traditionally owned land and not as a privately owned. So, they are not motivated to undertake long term investment measure such as tree planting that will ensure sustainable utilization of the land. This study therefore, intends to examine the impact of land tenure reform on investment and to determine its influence on sustainability of land management.

1.3 Objectives of the Study

The main objective of this study is to determine the influence of land tenure reforms on investment and sustainability of land management in Tanzania.Specifically this study will look on the following issues;

(i) To examine if land tenure reforms influence sustainability of land management.

(ii) To examine the influence of land tenure on long term investment(planting trees).

1.4 Significance of the Study

The study will be useful in providing informed decision to the policy makers on the important of land for long term investment. If farmers are given the ownership right own land; they will have the long-term commitment to it. For this case they can have a better choice on control measure of soil conservation for sustainable land management; for more agricultural productivity; and more food supply.

Furthermore, the information to be obtained in this study may enable civil society groups to play a vital role in influencing the policy formulation that improve land tenure security as a way of encouraging investments on long term conservation measures.

1.5 Organization of the Study

The rest of the chapters in this study are organized as follows; Chapters; two explores an overview of land tenure reforms in Tanzania; chapter three provides a review of literature on related topics, looking at both the theoretical and empirical studies on land tenure

reforms and investment. Chapter four focuses on the methodology which includes sources of data, variables measurement, variables descriptions and estimation techniques. Chapter five presents empirical findings and discussions; chapter six provides a summary, policy recommendations and conclusion.

CHAPTER TWO

AN OVERVIEW OF LAND TENURE REFORMS AND INVESTMENT IN TANZANIA

2.1 Introduction

This chapter provides an overview of land tenure reforms in Tanzania from pre-colonial period to date. It explores the type of land tenure, land laws and Acts that existed from pre-colonial period to present time. Lastly, the chapter explains the issue of land tenure and investment with the experience of other countries.

2.2 Land Concepts

Land can be defined in two broad ways that is; traditionally or non-traditionally (the latter is sometimes called the narrow definition of land). As defined by (Rwegasira 2012) traditionally the term land involves a wider meaning and application as it includes the surface of the land (soil) and all other things on the soil which are considered to be part of the land by nature; such as rivers, streams, lakes, lagoons, creeks, mines and minerals, trees like palm trees, or by being unnaturally fixed to it like houses, buildings and any other structures. It also includes any estate, interest or any other right over the land for example, the right to collect herbs or to hunt. With this definition, a person without physically owning a piece of land may have a right to claim interest(s) over it.

The non-traditionally definition of land is as it has been defined in the Land Act of 1999 (Tanzania Land Act 1999) that “Land” includes the surface of the earth and the earth below the surface and all substances other than minerals or petroleum forming part of or

below the surface; things naturally growing on the land, buildings and other structures permanently affixed to; or under land and land covered by water.

The non-traditional definition of land may sometimes be referred as to the statutory definition of land. With this definition, a person who owns land does not own any minerals or petroleum existing there. For this case, if it happens, minerals or petroleum are discovered on one's land, the holder shall be required compulsorily to transfer the land to the government as to give room for the mining industry.

2.3 Land Tenure

The term land tenure is derived from the Latin word, tenure, which means to "hold". Thus, land tenure means a kind of system of land ownership or holding the land. Land Act (revised laws of Tanzania, 2002) under the New Tanzanian Land Law all land belongs to the public but is vested in the president as trustee for and on behalf of all the citizens of Tanzania.

2.4 Land Law Reforms in Tanzania

Even before independence, a number of policy instruments were used in an attempt to improve the ownership regime in Tanzania. In 1923 the land laws came into force, the British colonial legislative assembly enacted the "*Land Ordinance cap 113"* to guide and regulate land use and ownership in Tanganyika which was their protectorate colon. Prior to this law, all the land in Tanganyika was owned under customary tenure governed by clan and tribal traditions, HAKIARDHI, (2005).

Tanzania attempted another land reform after independence in 1961; however, there were no great change made to the previous one. The only notable change made was the replacement of the word *governor* with *president*. Later, in order to avoid the creation of a small landed class freehold titles were converted into leaseholds under the freehold titles and government lease Act (cap 523) of 1963. Leaseholds were later changed into right of occupancy under the government leaseholds (conversion of right of occupancy) Act No. 44 of 1969.

Again, various laws and declarations were enacted during this period to reinforce decisions in land administration such as the Land acquisition Act number 47of 1967 which gave the president powers to acquire land in any part of the Republic of Tanzania for the national interest. Other laws included were under the 1967 Arusha Declaration, the Village and Ujamaa village Act of 1975, the Land Regularization Act of 1982 and the Local Government District Authorities Act number 7 of 1982. All these laws had a bearing on the rights to land for the majority small producers even though they did not transform the land tenure system into a better form than the previous one HAKIARDHI, (2005).

Again during the 1990's land reforms marked a very significant turning point in the development and administration of land tenure system in Tanzania. However, National land policy of 1995 and the land acts of 1999, (Land Act Number 4 and Village Land Act Number 5) still gave the president power to own land for the Government rather than decentralizing it to the lower organs of people's representation like the village assemblies, and district Councils. Recently, the driving force behind recent land reforms in Tanzania

which appears to cut across the entire East African region is the commercial interests that capitalize on commoditizing land to attract foreign investors HAKIARDHI (2005).

The current situation with regard to ownership, control and management of land in Tanzania is that: The radical Title is vested in the President as trustee for and on behalf of all citizens of Tanzania. For the purposes of management only, all land is classified as general land, Village land and reserve land. The President has powers to transfer land from one category to another. Reserve lands are forests, wildlife areas, etc., which constitute 28 percent of all lands. Village land is all land that falls under the jurisdiction of the existing 10,832 registered villages in the country which constitutes nearly 70 percent of all land. The rest is mostly urban land and that land already under granted titles. The Commissioner for Lands is the sole authority responsible for overall administration of all lands, but has delegated his powers to authorized land officers at district/municipal level. The Village Councils manage all village land with advice from the Commissioner for Lands. The reserved lands are managed by statutory bodies Tanzania Land Policy and Genesis of Land Reforms (2012).

2.5 The Land Distribution Paradox in Tanzania

The National Land Policy focuses on promoting a secure land tenure system, encouraging the optimal use of land and facilitation of a broad based socio-economic development without endangering the ecological balance of the environment. It seeks therefore to enable peasant farmers and herders to use land as an economic stand. Agricultural sector development policies and strategies support the implementation of the NLP of 1995 as the

strategy is dependent on land and landed resources such as water, forests, etc that have a far reaching effect on production. It recognizes the importance of tenure security to land and natural resource management.

The paradox is that with an abundance of arable land the country still experiences marginal land access under 3 hectares, per head. This is a real problem that the country must address (DILAPS, 2008).

2.6 Land Bank and Investment in Tanzania

The Land Bank was created under section 20-(1) of the Land Act, the law provides that a non-citizen of Tanzania shall not be allocated or granted land unless it is for investment purposes under the Tanzania Investment Act, 1997. It is intended that land for investment purposes will be identified, gazetted and allocated to the Tanzania Investment Centre (TIC) by way of right of occupancy. The TIC will, in turn, grant derivative rights to investors.

Fimbo, (2004) observed and elaborated that, the Act does not restrict other forms of acquisition of land rights by non-citizens. One can acquire the land without restriction by purchasing from government through auctions or tenders or from the Presidential Parastatal Sector Reform Commission (PSRC) in the process of privatization of public enterprises. Further, a non-citizen may obtain a derivative right from a village council (section 32 of the Village Land Act). No restriction is placed on purchases, by non-citizens, of rights of occupancy or even customary rights of occupancy in the market place. Further, there is no restriction on purchase by non-citizens of shares in companies holding

rights of occupancy. This is so to enable foreign investors to access land since they are considered agents for development.

2.7 Background of the Land Bank

The land bank concept existed even during colonial period, and it has been passed a number of replacements such as Agricultural Agency, National Development and Credit Agency (NDCA) in 1964, The Tanzania Rural Development Bank (TRDB) in 1971 and Later was replaced by the Co-operative and Rural Development Bank (CRDB), which is now operating as commercial bank. However, the concept was forgotten until 1991 when Tanzania was making a re-entry into the free market economy.

Legislation was enacted – The Tanzania Investment Act of 1997 that also created the Tanzania Investment Centre (TIC). The changes paved way for private investment, also enabled by the privatization of many public investments on land such as sisal, coffee and tea estates, ranches, and other parastatal organizations.

The basic premise of a land Bank at TIC is the creation of a register for land that is available for investment. Upon recovery, the Land Bank concept was rekindled at the Tanzania Investment Centre as a database of entries of landowners offering their land for investment, under various agreements.

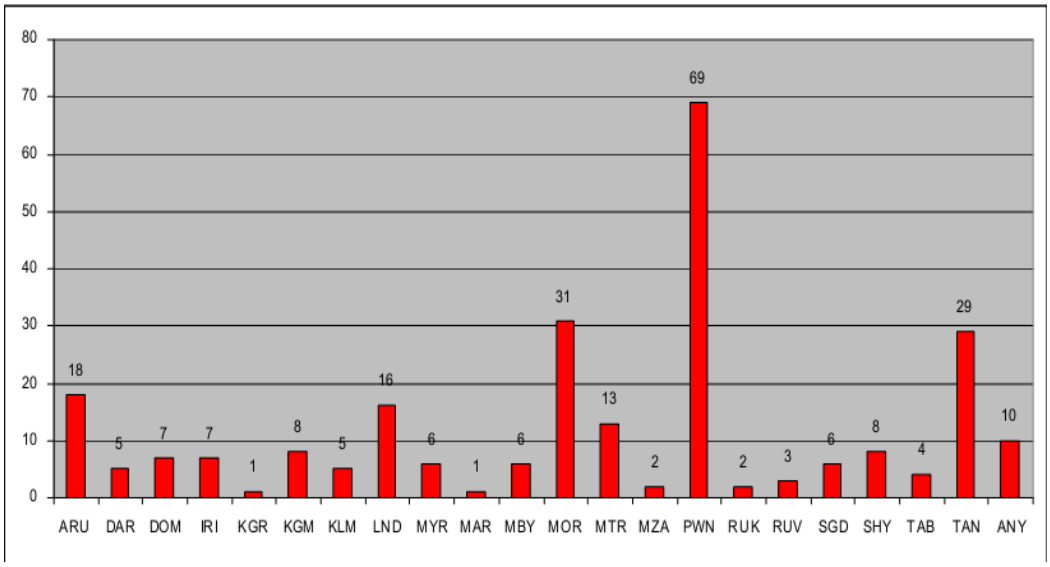
Since the registration with the Land Bank does not risk anyone's legal rights over land, it was and continues to be open to both private and public lands, whether the land is surveyed or not; and for both rural and urban lands. There are no costs for registration. It is a

measure that has been designed to meet the dynamic challenge presented by investors for an effective demand for land for investment. The free registration gives all groups of people the opportunity to expose their lands to investors.

Despite achievements in national land policy and legal reforms of 1995 to 2002, there still remain serious difficulties in accessing land in all categories of investment that include; land for industrial, commercial, housing, hotel and agricultural developments purposes in Tanzania. On a general assessment by TIC, it is more difficult to access land for large-scale farming than for any other use due to the large size of land required by investors.

Figure 2.1 and Table 2.1show some projects that have been registered with the TIC in year 2008 depending to the need of investors to various sectors in the country.

Figure 2.1: Demands for Farming Land to Investors by Region (2008)



Source: DILAPS (2008)

Figure 2.1 show preferences for investment in agriculture, as judged by the number of applicants. The figure shows that majority of the applicants are interested in lands located in Coast, Morogoro, Tanga, Arusha, Lindi and Mtwara Regions, with Coast region taking the largest share of the demand

Table 2.1: Registered Projects by Sector 1990- December 2006

S/No		Number of Projects	Total investment in TZS million	Total investment in USD million
1	Agriculture and Livestock Development	275	1,757,879	2,343.84
2	Natural Resources	163	465,586	620.78
3	Tourism	880	1,748,885	2,331.85
4	other sectors	2892	16,545,412	48,704.16
	Total	4,210	20,517,762	

Source: DILAPS (2008)

Table2.1 shows the total land that has been allocated for various projects by sectors. The data shows that, TIC provides land to the investors for various investments in various sectors through the land bank. It can be seen that, most investors like to invest mostly in sectors which are more likely to provide immediate returns compared to investing in the agricultural sector. The table further indicates that agriculture attracted about 275 Projects and other sectors consist of about 3935 projects.

With these facts it is expected that more people would be employed in the other sectors. However, it is quite surprising that the agricultural sector is the one which leads in job creation despite the small number of project registered compared to other leading sectors. The statistics from the labour force survey 2001 and 2006 show that the populations in agriculture sector employment were 13.9 million (82.2%) and 14.1 million (77%) respectively. These statistics indicate how agriculture sector employ people to larger extend compared to other (URT 2008).

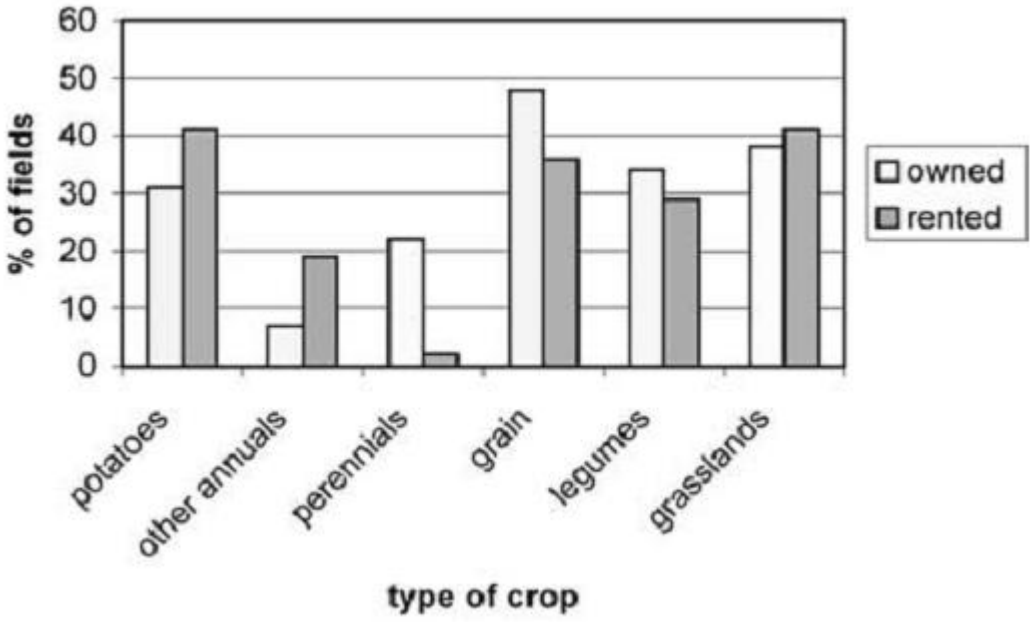
2.8 Experience of the Relationship between Land Tenure and Investment in Other Countries

The importance of land tenure security on land investment can be evidenced with the experience of other countries. Most research which has been done in some countries has shown how land tenure security is important for sustainable land management trough soil conserving investment.

2.8.1 Experience with Columbia

The data shows that land tenure is very important in determining what kind of investment to undertake on land, that is short term or long term land investment. The following figures obtained from the study done by Fraser (2004) showed the fact.

Figure 2.2: Percentage of Fields between 1996 and 1999 in Delta, BC.



Source: Fraser (2004)

Figure 2.2 shows the percentage of fields between 1996 and 1999 in Delta, BC, Planted to different crop categories in at least one year based on rented and owned plots. It shows that Grain, legumes (excluding peas and beans), and perennials crops (excluding raspberries) were planted more often on fields that were owner-operated, whereas potatoes and other annuals, were planted more often on rented fields.

Further, the figure shows that ownership of land in relation to perennials is stronger, where about 21 percent of owned operated fields were planted with perennials which is much higher compared to less than 5 percent of rented field which had perennials planted on them for at least one year between 1996 and 1999.

The above data may imply that land ownership affects crop choice in the sense that secure land tenure help farmers to choose crops (perennial crops like tree planting) which leads to better soil conservation. But in other case, farmers who do not own land tend to choose annual crops like potatoes to sustain their life as they don't have alternative land to plant perennial crops. Thus the higher use of annual crops on rented land confirms the view that farmers who rent fields will not have incentives to invest in long-term management. The greater use of perennials, and to a lesser extent grains and legumes, in owned fields, suggests that farmers who own their land are more frequently willing and able to sacrifice immediate income for soil conservation.

2.8.2 Experience in Ethiopia

Table 2.2: Cultivation Arrangements in Ethiopia

Variable	Number of conservation activities	Percent
Owner cultivated plots	2559	89.76
Sharecropped in plots	53	1.86
Sharecropped out land	137	4.81
Rented in	48	1.68
Rented out	50	1.75
Other	4	0.14
Total	2851	100

Source: Alemu (2000)

Table 2.3 shows different cultivation arrangements in Ethiopia and the existing relationship between the forms of land holding and participation in soil conservation. It can be seen that around 90 percent of the reported plots with some soil conservation structures were owner-cultivated lands, whereas the remaining ones were owned by the reported household and sharecropped out to other households for cultivation.

Again, this data imply that, land tenure is very important for sustainable land management. The data shows clearly that the ones who own the land are more willing to have land investments which conserve the soil.

2.8.3 Experience in Kenya

Table 2.4 presents Land tenure and whether trees are planted on field or not, in Kenya (Machakos and Kitui districts) in 2000

Table 2.3: Land Tenure and Plantation of Trees in 2000 (Machakos and Kitui Districts)

Tenure regime	**Trees planted**	**Trees not planted**	**Total**
Private title deed	31 (8.4 %)	117(31.6%)	148(40%)
Still obtaining title deed	28 (7.6%)	131(35.4%)	159(43%)
Traditional private rights	10 (2.7%)	52 (14%)	62(16.7%)
Communal rights	0 (0%)	1 (0.3%)	1 (0.3%)
Total percentage	69(18.7%)	301(81.3%)	370(100%)

Source: Mwakubo (2002)

Table 2.4 shows how the land tenure regime influences some long-term investments on the farm like tree planting. The table shows that private title deed have the highest percentage (8.4 percent), followed by still obtaining title deed (7.6 percent), traditional private rights (2.7 percent) and communal rights (0 percent). This also may imply that,

tenure is very significant in deciding what kind of long term investment to do on land for sustainable land management. It can be seen from the table that, the ones with private title deed are more motivated to engage in long term investment like tree planting as they are assured of the returns which take long time to have them than the ones with other type of title deed.

2.9 Conclusion

In conclusion we can say that, land tenure is very important for land investment as it gives assurance to the owner on the returns that accrues over a period of time from such investments. Further evidence from other countries will be shown as part of the review of the literature.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter reviews both theoretical and empirical literature on land tenure reforms and investment which have been done by various scholars from different countries. The theoretical literature entails theories on sustainability of natural resources management including land. The empirical literature reviews what other scholars have found and written on land tenure reforms basing on long term land investment and sustainable land management.

3.2 Theoretical and Empirical Review

(Bromley and Cernea,1989; Wachter, 1992) argue that, many environmental problems such as soil degradation and forest depletion can be characterized as the result of incomplete, inconsistent, or non-enforced property rights. This suggests that, complete, consistence and well enforced ownership (property rights) on natural resources such as land can be one of the incentives to conserve them.

Coase (1960) argues that the absence of clearly defined property rights inevitably leads to degradation of soils and other natural resources. The general interpretation of these theorems from the 1960s onwards was that collectively owned property was the culprit for the forest destructions, land degradation, and water pollution and that private property is crucial to sustaining natural resources.

Again, Hardin (1968) argues that where property regimes are non-existent, natural resources(including land) are prone to overexploitation because the cost off-site impacts, such as water pollution or overgrazing pastures or over cultivation, are borne by the community as a whole, but the potential benefits accrue to the individual. Link this to the issue of land and soil conserving investment it can be seen that; if one does not own the land one tends to plant crops which are not conserving the soil but have higher returns; in turn the impact of soil problem will be borne by the community while benefits accrued to the investor.

Generally theoretical literature advocates for privatization of land based on the argument that farmer's incentives to invest in technologies are inhibited by weak tenure security arising from indigenous property right institutions and by lack of land titles hindering their capacity to obtain credit to make investments (Shiferaw and Holden, 1999; Kabubo-Mariara, 2004, 2007).

Most studies about land tenure and investment have been done in Ghana, Ethiopia, Columbia and Kenya. The findings from these areas seem to be consistence with the fact that land tenure security influences the land investment decision, (See for example, Fraser, 2002; Dercon and Ayalew, 2005; Besley, 1995; Alemu. 2000; Awudu et al., 2010; and Mwankubo, 2002).

Besley, (1995) examined the link between property rights and investment incentives from two regions in Ghana. The study investigated the possibility that rights are endogenous with farmers making improvements to enhance their land rights. The findings in one region

supported the idea that better land rights facilitate investment. However, the size and significance of the effects were increased after instrumentation of land rights. The results in the other regions were not so robust.

A study on land tenure and natural resource management in semi-arid areas in Kenya by Mwakubo (2002) revealed the importance of land tenure security on land management. The study was carried out in Machakos and Kitui Districts; Two modelling strategies were used, Tobit to determine both probability of farmers deciding to terrace and the intensity of terracing; while, three stage Least Squares to establish the direct and indirect effects of tenure on terracing levels. The study findings showed that, while, the likelihood of intensified terracing is significantly influenced by tenure security, terracing levels was not directly significantly influenced by tenure security but rather indirectly through the use of fertilizer. Generally, it can be viewed that, land tenure is an important ingredient in long term investment specifically for the investment that conserve soil. For this case, land tenure security together with other factors (fertilizer, farm size, etc) has to be taken into account for better land management.

The article by Awudu et.al, (2010) on land tenure differences and investment in land improvement measures (theoretical and empirical analysis), develops a theoretical framework to examine the relationship between land tenure arrangements and households' investment in soil-improving and conservation measures. With the use of multivariate Probit model; the study tested the hypothesis that investment in productivity-enhancing and conservation techniques are influenced by land tenure arrangements. Both theoretical

and empirical results generally disclose that land tenure differences significantly influence farmers' decisions to invest in land improving and conservation measures. However, the findings of the study revealed that land tenure security does not affect farm productivity.

Alemu, (2000) focused on the effects of tenure (in)security on long term investment, with particular emphasis on the construction of soil conservation structures. The relationship was analysed basing on the possibilities of land redistribution which were based on customary land tenure system for which such arrangement was postulated to lead to insecurity in household landholding. The study aimed to test whether such arrangements were disadvantageous to soil conserving activities. The obtained results concluded that tenure security influences soil conservations' participation positively while the effect of insecurity was negative. However, there other factors such as non-farm income, distance and assets of the household that also influences the decisions of farmers to invest.

A study by Dercon and Ayalew, (2005) about tenure security and investment provided evidence that the institutions of the property rights matter for efficiency, investment and growth. With the use of panel data, the study investigated whether transfer rights and tenure insecurity affect household investment decisions, focusing on trees and shrubs. The panel data estimates suggested that limited perceived transfer rights, and threat of expropriation, negatively affects the long-term investment in Ethiopian agriculture, contributing to low returns from land and perpetuating low growth and poverty. In this sense it can be seen how important it is to initiate land tenure security for efficiency, investment and growth.

More than that, a study on soil conservation on rented and owned fields in southwest British Columbia by Fraser (2002); supported the literature and confirmed that farmers who do not own their land face a high discount rate and plant more crops that provide only short-term return. Farmers who own the land promote long-term management and plant crops that help maximize soil conservation. Long-term leases do not seem to provide the same incentives as land ownership.

The analysis of the study confirmed that land ownership, affects crop choice in the sense that the results were consistent with the hypothesis that secure land tenure leads to better soil conservation. In this case, the higher use of annual crops on rented land confirmed the view that farmers who rent fields will not have incentives to invest in long-term management while the greater use of perennials, and to a lesser extent grains and legumes, in owned fields, suggested that farmers who own their land are more frequently willing and able to sacrifice immediate income for soil conservation.

Although many studies suggest that land tenure influences land investment decision, there are some studies which have expressed different views on the relationship between the level of investment and productivity (Chirwa 2008 and Mwankubo 2002, Awudu et al 2010).

The study by Mwankubo, (2002) found that land tenure is an important factor in land investment decision (terracing) but on the level of investment (terracing levels) is not directly but rather indirect through the use of fertilizers. This suggests that one can not

only rely on land tenure security on decisions to land investment but also consider other factors which may have positive impacts on investment.

Chirwa (2008) highlighted the impact of the land reform programme on investments, food production and agricultural productivity. The findings showed that smallholder farmers who participate in the community-based land development programme had increased access to land and financial resources, were more likely to invest in improved maize seeds, tend to be more productive, and had overall better welfare than non-participants. However, the econometric results showed that those positive effects were driven more by access to the financial resources provided under the package of assistance, than change in land tenure per se. The findings of the study gave emphasis to the importance of complementary investments and assistance in order for land reform programmes to have significant impact on poor smallholders. So for land tenure security to have significant impact on productivity there should be financial support to the farmers. However study findings by Awudu et al (2010) suggested differently on the relationship between land tenure and productivity. The findings revealed that land tenure security does not affect farm productivity.

Some studies have tried to relate the issue of land tenure security to investment and collateral security such studies include that of (Deiniger 2003 and Besley 1995). The former tried to see if investment on land has an influence on tenure security and the later to see the impact of land tenure to investment through collateral security.

Deininger (2003) used a large data set from Ethiopia that differentiates tenure security and transferability to explore determinants of different types of land-related investment and its possible impact on productivity. While they found some support for endogeneity of investment in trees, it was not the case for terraces. Transfer rights were unambiguously investment-enhancing. The large productivity effect of terracing implied that, even where households undertake investments to increase their tenure security, it may not be socially efficient. Hence the study suggested that, the government action to increase tenure security and transferability of land rights can significantly enhance rural investment and productivity.

Besley(1995) developed theoretical argument based on security tenure, the study use land as collateral security. However, the results did not strongly support the theoretical view, as the collateral argument suggested that household rights rather than field-specific rights should matter for the investment decision. Rendering land as collateral should not be tied to financing an improvement on that field. The former could always offer up another field with secure right as collateral.

More than that, the study on land tenure security, investments and the environment in Ghana by Twarefou, et.al (2011) examined empirically two main issues: first, the causal relationship between land tenure security and investment and secondly, the impact of tenure security (land rights) on environmental degradation. Analysis of the results indicated that investment in farmlands in Ghana was low and appeared not to enhance tenure security and that the reverse causation of tenure security enhancing investment

seems non-existent. The findings implied that agricultural investments in the country were not security-induced and that investment was not an important determinant of tenure security.

However, tenure security appeared to be an incentive for investment in that when endogeneity was not controlled, tenure security had a positive and significant impact on investment though the result is not robust. The implication was that, farmers with tenure security were more likely to invest in their lands, which may eventually lead to higher productivity. Furthermore, their results indicated that tenure security had no significant impact on environmental degradation apart from the destruction of vegetation cover, which appeared to be a major environmental problem in Ghana.

Furthermore, the study on land tenure, investment, and agricultural production in Nicaragua by Foltz, et.al (2000) investigated the relationship between rural land rights and agricultural credit, investment, and rural incomes (on farm and off farm). Results indicated that, total credit received was significantly and negatively related to female-headed households and households with no documented form of land rights. While there was no significant relationship between investment and land rights and household characteristics, tenure status was significantly related to the number of trees on the property (a form of long-term land investment). Farm income, was shown to be increasing in the degree of tenure security, education of the household head, farm size, and individual operation, and decreasing in the years since acquiring the property. In sum, the results

indicated that improved clarity and enforcement of rural property structures can have a positive impact on rural credit access and farm profitability.

Some literatures have shown that the relationship between land tenure security and investment is more complicated than it appears. This is because of the nature of causality between them. In general many studies such of (Deininger 2003; Chirwa 2008; Fraser 2002) point out that secure land tenure increases incentives to undertake productivity and soil conservative enhancing land-related investments.

Three main links between land rights and investment incentives have been clearly identified in the literatures. The first link portrays the positive relation between the tenure security and investment incentives; in other words land tenure security influences positively the land investment decision (Jacoby et al.., 2002). The second link emphasizes the effect of the rights to land as collateral on the investment incentives; in other words land can be used to obtain loan from bank and use it for investment (Feder and Feeny, 1991). The third ones, is the link between investment incentives and land transfer rights (Besley, 1995).

3.3 Conclusion

This chapter has provided both theoretical and empirical literature reviews on land tenure basing on long term land investment and sustainable land management. The reviewed literatures shows that it is not only land ownership that influence long term investment decision for sustainable land management; but also among other factors non-farm income,

education, and distance from field plot to home/market, assets on household, number of plots, value of domestic animals, quality of plots, slope, farm size.

Although most studies suggest that land tenure influences long term investment others have shown that the influence is not that direct but rather indirectly or in support with other factors like use of fertilizers, and finance. Thus, three links about land tenure were identified from the literatures which includes investment, collateral security and transfer rights.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter explains the theory and methodology to be used in analyzing the relationship between land tenure and investment under this study, in view of theoretical and empirical literature. Then, it describe model specification; definition and measurement of the variables that model used; describes the estimations techniques; states hypotheses of the study; explains the data sources; lastly presents the data analysis and method employed by the study.

4.2 Producer Theory

The economic theory underlying this study is the theory of Production. Producers/farmers face trade-offs in their production decision-making process, since they want to maximize profit/output while constrained with cost of production. In order to make decision, farmers/producers must consider cost of production for better out/ payoff.

A major constraint in this study will be presented by land tenure security, of which will determine the decision of the farmers upon long term investment for sustainable land management. The farmer has two possible alternatives that are either invest or not to invest.

Farmers experience various problems in their activities which include wealth, erosion, slope, household size, fertilizers and pesticides, farm orientation, land ownership, distance

from plot to home, distance from plot to market, distance from plot to road, age and level of education. While they wish to solve these problems for long term investment and sustainable land management; they have been constrained by land tenure security which makes some difficulties for them to decide on whether to invest or not.

4.3 Estimation Techniques

Factors that influence the probability decision on tree plantation are analyzed using Probit regression model. This is because the nature of the dependent variable contains binary outcomes. The estimation of dependent variables of this nature are commonly done in the following ways, namely the linear probability model (LPM), the binary logit model, binary Probit model and the log-log model (Long 1997).

Linear Probit model is the simplest model to apply to a binary dependent variable, however contains various problems because; although the interpretation of the parameters is unaffected by having a binary outcome, a number of assumptions of the linear regression model are violated. Heteroscedasticity that is the variance is not constant in such a way that the OLS estimator of the parameter is insufficient and the standard errors are biased, resulting in incorrect test statistics; normality that is errors are not normality distributed; nonsensical predications for the probabilities; linear functional form in which makes any changes in a factor being unrealistic in this case a model should be nonlinear in general when the outcomes is probability (Long 1997). Even though the mentioned problems are resolved, the LPM is still not attractive. In practice the Logit and Probit model are chosen to analyse variables for which dependent variable has binary response.

The Logit and Probit model are very similar and close to each other. In practice the logit and Probit model yield similar results, the only observed different between then is the variance whereby in the Probit we assume $Var(\varepsilon/x) = 1$ and in the Logit model we assume$Var(\varepsilon/x) = \pi^2/3$. For this case, the logit and probit cumulative curve differ in tails whereby one has a thicker tail and the other has a thin tail (Long, 1997).

Thus, using either model leads to the same result (Maddala, 1983). This study adopted the Probit model based on the fact that the model is specified by assuming the error term that follows normal distribution and since, we need mean and variance which is not possible to obtain in the case of latent variable (unobserved dependent variable) then, we add other assumptions which are; $E\ (\varepsilon_i/x) = 0$ and $Var\ (\varepsilon_i/x) = 1$.

4.4 Probit Model

The Probit model is used for the binary outcomes of a dependent variable. This model is developed first in terms of the regression of the latent variable. The latent variable is related to the observed, binary variable in a simple way: if a latent variable is greater than some value, the observed variable is 1; otherwise it is 0. This model is linear in latent variable, but results in nonlinear, *S* shaped model relating the independent variables to the probability that an event has occurred (Long, 1997).

Assume that there is an observed or latent variable $y*$ ranging from $-\infty\ to\ \infty$ that generates the observed $y's$. Those which have larger values of $y*$ are observed as $y = 1$, while those with smaller values of $y*$ are observed as y=0

The latent $y*$ is assumed to be linearly related to the observed $x's$ through the structural model:

(1) $$yi = \begin{cases} 1\ if yi* > \tau \\ 0\ if yi* \leq \tau \end{cases}$$

Where; τ is the cut point. If $y* \leq \tau$, then $y = 0. If\ y*$ crosses the cut point τ $(i.e., y* > \tau)$, then $y = 1$.

Since y* is continuous, the model avoids the problems encountered with the LPM. Yet, the dependent variable is unobserved; the model cannot be estimated with OLS. Instead, we use ML estimation, which requires assumptions about the distribution of the errors. Most often, the choice is between normal errors which results in the Probit model. As with the linear regression model, we assume $E\ (\varepsilon/x)\ = 0$

Since y* is unobserved, we cannot estimate the variance of the error terms as it is in the linear regression model. In the Probit model we assume that variance $Var\ (\varepsilon/x)\ = 1$.

The cumulative distribution function for the normal distribution with expectation of zero and variance is one, is given by the following formula

(2) $$\Pr(y = \tfrac{1}{x}) = \int_{-\infty}^{\varepsilon} \frac{1}{\sqrt{2\pi}} \exp(\tfrac{t^2}{2}) dt$$

The cumulative distribution function indicates the probability that a random variable is less than or equal to a given value.

4.5 Definition and Measurement of Variables

The dependent variable in this study is the individual's choice to have long term investment on land that is to plant trees or not. When an individual own the plot then there is a greater possibility to plant trees as a long term investment. In other words, investment in this study is measured by the type of conservation measures employed by the farmers for this case it is planting trees.

The independent variables include; age which is measured by number of years an individual has particularly age of head of the household; sex entail the gender of the head of the household that is female or male; education is measured by the highest grade level completed by an individual that is the highest level of education attained by the household head which can be adult education, primary education, secondary or tertiary education; hhsize this entails the size of the household that is number of individuals who permanently live in the household; lwealth this entails the logarithm of wealth of the household and it is proxed by the value of the assets of the main homestead in Tshs.

Ownership entails whether the plot that has been planted with trees owned by the household or not in the year 2008; Erosion entails whether there were any problems with erosion on the mentioned plot in the long rainy season 2008; slope entails how steep is the slope of the plot that is flat bottom, flat top, slightly or very steep slope.

Then, dstph is distance in km from plot to home; dstpr is distance in km from plot to road; dstpm is distance in km from plot to market; fertilizer is whether the household used any organic/inorganic fertilizer on the plot in the long rainy season 2008 in kgs per acres; labor is whether the household hired any labor use on the plot that is number of people employed

to work on the mentioned plot; advice is whether the household received agriculture advice over the plot and acres which entails size of the plot in acres.

4.6 Hypotheses

Following the theoretical and empirical literature review, the following hypotheses will be tested in analyzing the factors that influence decision on trees plantation in Tanzania.

i) The ownership on land has a greater influence on trees plantation.
ii) Land ownership influences choices on long term investment which promote sustainable land management

4.7 Source of Data Used in the Study

The study employs cross-section data collected by the National Bureau of Statistics. The data are the first wave of the panel data. The data is based on a nationally representative household on agricultural production.

4.8 Data Analysis Methods

The study has explored the advantages of descriptive analysis and binary Probit regression for analyzing the influence of land ownership on trees plantation for sustainable land management.

Since, multicollinearity and Heteroscedasticity problems are common in cross sectional data; Variance Inflation Factor (VIF) test for multicollinearity and Breusch-Pagan test for Heteroscedasticity were employed after estimation to measure validity of the data.

4.9 Conclusion

This chapter described the econometric model used in the analysis of the study. From the literature Awudu et al (2010) used Multivariate Probit model to evaluate land tenure differences and investment in land improvement, since the choices (type of land tenure) were more than two which can't apply with normal probit model. In this study the Probit model was used because the choice was basing on two decisions (planting trees on not as a long term investment).

CHAPTER FIVE

EMPIRICAL FINDINGS AND THEIR INTERPRETATIONS

5.1 Introduction

This chapter presents summary statistics and empirical findings of various variables that have an influence on decision to trees plantation in Tanzania. The summary statistics include mean, standard deviation, minimum and maximum values. It also, presents the marginal effects of the probit model as well as the comparison results with other findings of the related study.

5.2 Sample Characteristics

The study has employed first wave of National Panel Survey Data from National Bureau of Statistics which was collected in 2008/2009 across all regions in Tanzania. The survey involved 6119 of plots, out of which, 4,642 were in rural areas and 1,477 were in urban areas,representing 75.86 percent and 24.14 percent for rural and urban areas respectively. Since most of agriculture activities are undertaken in rural areas, the sample selection was quite representative in both areas. For purpose of this study, only rural areas sub-sample is used in the analysis. The choice is justified by the fact that more plots were from rural areas where most agricultural activities are undertaken than in urban areas.Table 5.1 provides descriptive statistics of key variables used in the analysis. The results show that majority of the respondents were male representing about 78 percent.

Table 5.1: Summary of Descriptive Statistics

Variable	Variable description	Mean	Std. Dev.	Min	Max
Trees	If plot is planted with trees	0.31	0.46	0	1
Age	Age of household head	47.58	15.23	19	97
Sex	Sex of household head	1.21	0.41	0	1
adult	Highest level of education attained by household head	0.01	0.09	0	1
primary	Highest level of education attained by household head	0.64	0.48	0	1
secondary	Highest level of education attained by household head	0.07	0.25	0	1
tertiary	Highest level of education attained by household head	0.00	0.07	0	1
dstph	Distance from plot to home in km	2.67	4.62	0	72
dstpr	Distance from plot to road in km	2.03	3.15	0	45
dstpm	Distance from plot to market	7.71	8.82	0	80
flat_b	If the plot is flat bottom	0.41	0.49	0	1
flat_t	If the plot is flat top	0.09	0.29	0	1
slightly	If the plot is slightly sloped	0.27	0.45	0	1
vsteep	If the plot is very steep sloped	0.03	0.18	0	1
erosion	If plot impacted with soil erosion in 2008	1.87	0.34	0	1
ownplot	Ownership of the plot	0.83	0.38	0	1
Organic fertilizer	If applied organic fertilizers	1.90	0.30	0	1
Inorganic frtilizer	If applied inorganic fertilizer	1.90	0.30	0	1
pesticide	If applied pesticides	1.90	0.31	0	1
hhsize	Household size	5.66	3.02	1	46
advice	Farm advice	0.24	0.43	0	1
acres	Size of the farm	2.38	10.11	0	600
labour	Number people employed	4.62	15.21	0	396
lwealth	Wealth of the household	9.50	1.78	0	16.9

Source: Own computations

The average age of the sampled population is 47 years old in which minimum age is 19 years and maximum is 97 years old, this implies that 80 percent are of economically active age and 20 percent not so much active though they may participate in some activities. The results further shows that majority of the population in the sample finished at least primary education (72 percent), which imply that can at least be able to read and write.About 28 percent of the sampled population can not read and write. Also, from the sampled population, 21 percent were female and 79 percent were male.

Again, the results show that about 26 percent of the sampled plot are very near to homestead (in other words zero distance); 21 percent are very near to the road; and 9 percent are very near to the market place. This implies that most of the sampled plots are much closer either to homestead or road. The remain ones (44 percent) some are very far and others not too far. The results further shows that most of the sampled plots have flat bottom slope (40.65 percent) and slightly sloped (27.40 percent). This implies that few of the sampled plots were flat top or with very steep slopes.

Most of the sampled plots were not affected by soil erosion in 2008 such that 86.71 percent were not affected by erosion and only 13.29 percent plots were affected by soil erosion in that particular year. The plausible reason for this may be due to nature of the slope of most of the sampled plots, as it has been indicated from above that most of the sampled plots are flator with slight slopes.

Most of the sampled plots (ownplot) were owned by the households (83 percent) and only 17percent of plots were not owned. The results further shows that for the sampled plots

only 31 percent were planted with trees and 69percent had no planted trees on them. This is quite surprising as it was expected that, more plots will be planted with trees as most of them are owned by the households. However, the possible explanation may be due to the nature of the slope, but this may be highly influenced with the ownership of land. If the owned plot is steep slope the owner will bother to plant trees to avoid soil erosion than if the plot is not owned. In this case, it is not only nature of slope but also the ownership right that influnce trees planting.

Further the results show that, most of the sampled plots were neither applied with organic fertilizers, inorganic fertilizers nor pesticides. As only 10 percent on avearge applied agricultural inputs. The possible reasons for this may be that, most of the farmers are poor to afford the use of such agricultural inputs.

The results shows that most of households on avearge have five members (52 percent). However, inlarge most of the household members are ranging between 3 and 7 that is (13 percent on average).

The results shows that on average most households own atleast 2.4 acres. The results further show that, on average 4 people were employed to work on sampled plots. Also, the sampled households that received agricultural advice (extension) for the year 2008 was only 24 percent suggesting that majority of the household could not be reached by the extension officers.

5.3 Heteroskedasticity Test

To test for heteroscedasticity, Breusch-Pagan test was employed in the analysis. The test's results are shown in Table 5.2. Since, the probability is less than 0.05 which indicate that the results are significant, null hypothesis of the homoskedasticity is rejected at 5 percent level of significance. Hence, variance is not constant.

Table 5.2: Breusch-Pagan Test for Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity
Ho: Constant variance
Variables: fitted values of trees
chi2(1) = 43.83
Prob> chi2 = 0.0000

Source: Own computations

Heteroscedasticity was corrected with the application of robust variance to the models. The variables coefficients' were almost the same, implying that the problem of Heteroscedasticity is not severe and for that matter the normal coefficients used in the analysis.

5.4 Variance Inflation Factor Test for Multicollinearity

Results for multicollinearity test are shown in appendix I. The results show that there is no multicollinearity problem, because the variance inflation factors for all variables are below the mean VIF.

Multicollinearity is a common problem with cross section data, thus, we have to test for it. However, in the model used, no multicollinearity was found for any of the variable.

5.5 Endogeneity Test

Endogeneity test was performed in the model to check the existence of Endogeneity problem. Trees planting and land ownership are variables likely to cause Endogeneity problem due to two way causation among them (Awudu et al., 2011). The result shows that, there is no Endogeneity problem in the model as shown below. The null hypothesis which states that, there is no Endogeneity was not rejected even at 10 percent significant level. That is, coefficient of the error term (vhat) is not significantly influencing the dependent variable (tree planting).

Endogeneity Test

(1) [trees]vhat = 0
chi2(1) = 0.01
Prob > chi2 = 0.9142

5.6 Binary Probit Model Estimates of the Influence of Land Ownership on Tree Planting

The Binary Probit model was used in analyzing the influence of land ownership on planting trees. The results for the Probit model are attached in the appendices in view of the fact that it does not make much sense to interpret them; instead its marginal effects were used for the analysis.

Table 5.3: Marginal Effects Estimates for Trees Plantation

variable	dy/dx	Std. Err.	P>z
age	0.00251***	0.00058	0.000
sex	-0.0216331	0.0209	0.301
primary	0.0952847**	0.01945	0.000
secondary	0.1099904***	0.03874	0.005
tertiary	-0.0920158	0.10261	0.370
dstph	-0.025371***	0.00428	0.000
dstpr	0.0039936	0.00421	0.343
dstpm	0.0030994***	0.00096	0.001
flat_t	-0.0437758*	0.02617	0.094
slightly	0.0661955***	0.01855	0.000
vsteep	0.154805***	0.04505	0.001
erosion	0.038826	0.02519	0.123
ownplot	0.2143511***	0.01887	0.000
Organic	-0.1266701***	0.02759	0.000
inorganic	-0.0172466	0.0289	0.551
pesticide	0.0952193***	0.0284	0.001
hhsize	-0.0014488	0.00302	0.631
advice	-0.0086455	0.0198	0.662
acres	0.0000364	0.00057	0.949
labour	0.0001898	0.0005	0.703
lwealth	-0.0285217***	0.00536	0.000

Source: Own computation
*****, **, * is 1, 5 and 10 percent significant level respectively**

Table 5.3 shows marginal effects results for tree planting. Marginal effects explain a change in independent variable over the change in the probability of the dependent variable. For the case of this study, the marginal effects explain the change in independent variables as described in the model above over the change in the probability of the owner's decision to plant trees or not to plant trees on a given plot.

It can be seen that age, primary schooling, secondary schooling, dstph, dstpm, flat_t, slightly, vsteep, ownplot, organic fertilizer, pesticide and lwealth appeared to have great influence on the decision by the household to plant trees.

The Probability of planting trees on a plot increases with age, primary education, secondary education; dstpm, slightly, vsteep, ownplot, and pesticide, all variables mentioned are at 1 percent level of significance.

As with education, heads of households with a bit higher level of education tend to have higher probability of deciding to plant trees than the ones with lower level of education. The possible reasons for this might be due the fact that, educated people know better about the importance of planting trees than those with a lower level of education. However, the results show that tertiary education does not have significant influence on the decision to plant trees.

The probability of tree planting increase with the dstpm by 0.003 which means that as the distance from plot to market increases there is a possibility of planting trees on that plot. This implies that, farmers do not like to plant trees on plots that are nearer to the road. The possible reason for this is that, most of the plots near to the roads are used for off-farm activities like businesses.

Again, the slope of the plot matters in explaining tree planting, where by different slopes have different influence on the trees planting decision. It can be seen that the probability of planting trees on the plot with a very steep slope is much higher compared to ones with a flat bottom or slightly sloped. This shows that it is the very steep sloped plots that have

higher probability of getting soil conservation (trees planting) as compared to the flat bottom plots because sloped areas are much affected by erosion.

The results further shows that the probability of planting trees increases with ownership of land (ownplot) implying that with one's own land increases the incentive for tree planting (long term investment) because farmers are able to realize the benefits of trees plantation that occur over time. It takes 25 years of a farmer to realize the profit of trees plantation with such a time horizon, it would be sensible for a farmer to participate in tree planting if they were assured of the ownership of the land for at least 25 years.

These findings can be compared to the study by Mwakubo, (2002) on land tenure and natural resources management in semi-arid areas of Kenya. The study investigated both the probability of farmers deciding to terrace and the intensity of terracing conditional. It was found that, tenure security significantly influences the likelihood of intensified terracing which is an investment in land. Generally, the findings by Mwakubo show that land titling really important to soil conservation investments for better management of the soil as natural resource.

Further, the result show that, the probability of planting trees increases with the pesticide by 0.1 which implies that, the ones who apply pesticides on their crops are more likely to plant trees to avoid soil erosion on the plots.

Furthermore, the probability of planting trees decreases with dstph, organic fertilizer, lwealth; each at 1 percent level of significance and flat_t at 10 percent level of significance. The results show that the probability of planting trees decreases with

distance from plot to home which means that as the distance from plot to home increases the possibility of planting trees to that plot tend to be lowered, implying that nearer plots are likely to get more attention from the farmer. This is possibly due to the fact that majority of the rural community depend highly on forest for their wood fuel demand. Thus the nearby plots could be the better place to plant trees which can also supply energy sources and other non-timber products. This finding is consistent with previous study by Alemu, (2000) on insecure land tenure regimes and soil conservation. Were it was found that, physical distance from plot to place of residence as an important decision as well as one of the major magnitude variable determining soil conservation. Also, the finding suggested that tenure is very important in determining the decision to invest or not to invest on soil conservation.

The probability of planting trees decreases with the plot being flat or steep which means that, with the plot being flat the probability of planting trees decreases as, is conducive for other crops plantation in the context of soil conservation. This may also be due to the fact that flat areas are not much affected with erosion, thus the likelihood of planting trees to flat areas is lower compared to the steep ones for those household which are planting trees as a conservation measure to soil erosion.

Moreover, the probability of planting trees changes depending on wealth of the household, approximated here by the value of assets owned by the household. Results show that wealth has a negative impact on tree planting (long term investment). A possible explanation of such results would be that wealthier framers have more assets with which

to sustain their lives rather than depending much on agricultural activities to bother conserve the soil. However, other way around can be said that, poor people tend to depend much on forest(trees) to meet household daily requirement like charcoal or firewood. But, again, the rich people may also tend to plant more trees not for daily requirement but rather as commercial issues.

Further, in this study the size of the farm/plot (acreage) was found to be insignificant in affecting the probability of tree planting (long term investment on land) decision which is different from the results revealed by Mwakubo, (2002). According to the findings of the study farm size per capita was found to be negative and significant, which implies that as land becomes scarce the more the farmers invest in soil conservation. The plausible reason for this is that, to meet their livelihoods, farmers have to increase productivity which is possible through soil conservation investments together with other inputs such as manure and fertilizers.

5.7 Conclusion

This chapter presented the empirical findings according to the objective of the study; and went further, to show the differences and similarities with other related studies from various authors. In the next chapter will see the recommendations and policy implication of the study findings.

CHAPTER SIX

CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents conclusion and policy implications based on the findings from the study. First, it gives a brief summary on the results obtained by the model followed by policy implication. Final section outlines limitations of the study and suggests areas for further study.

6.2 Summary and Conclusion

The purpose of the study was to examine the impact of land tenure reforms on investment and to determine its influence on sustainability of good land management practices. Specifically, the study aimed to examine the influence of land tenure reforms on sustainable land management practices and also to examine the influence of land tenure on land investment (trees plantation). The study employed an econometric analysis in which a probit model was adopted and applied.

A trees probit equation was estimated and used with the following variables; age, sex, education at different levels that is adult, primary, secondary and tertiary; distance which included distance from plot to home (dstph), distance from plot to market (dstpm), and distance from plot to road (dstpr); slope which included flat bottom(flat_b), flat top (flat_t), slight slope (slightly), very steep slope (vsteep); ownerhip of the plot (ownplot) that is whether the plot is owned or not; organic fertilizer that is whether the plot was applied with organic fertilizer, pesticide whether the mentioned plot was applied with

pesticide and lwealth which involves the wealth of the household for which in this study assets values owned by the household was the prox wealth.

To identify the influence of each variable on tree planting; Probit regression model and descriptive analysis were used to see their significances in explaining the issues of investment on land, specifically, tree planting.

6.3 Policy Implications and Recommendations

The analysis showed that, the probability of planting trees increases with ownership of land (ownplot) implying that if one's own land increases the incentive for planting tree (long term investment) because farmers are able to realize the benefits of tree planting that occurs over time. Therefore, farmers have to be assured of land ownership for them to practice a better management of the land as this will motivate them to sacrifice short term returns for soil conservation as well as to undertake long term investment.

Again, the study found that, it is not only land ownership that influences the probability of tree planting but also other factors (such as distance from plot to home/market; slope of the plot; and organic fertilizers as well as pesticide). Therefore, the issue of land investment for sustainable land management has to consider both factors for it to have a meaningful impact.

The study suggested that, major changes in land conservation investments will require attention to all these factors because no single factor can be used as a major policy influence instruments. In this sense all factors (land ownership, characteristics of the plot

like slope and distance where the plot is located, and also agriculture inputs like fertilizers and pesticide) have to be taken into account for land conservation investment and sustainable land management.

6.4 Scope, Limitation of the Study and Recommandations for Further Research

This study evaluates the relationship between land tenure reforms and investments on land which tend to conserve the land for sustainable land management. The study aims at analyzing the influence of land ownership on the trees plantation as the long term land investment. Households are used as the point of analysis in this study. The coverage of the study is rural part of Tanzania with sample 4,642 plots. The focus of the study is on cross sectional data of 2008/2009 of the first wave of the National Panel Survey data.

Furthermore,the study has looked at the influence of land ownership on trees plantation (long term investment as one of the measures for conserving land and better management) in Tanzania. However, many things can be done to see how land can be used as an incentive to promote land conservation as an investment.., Further studiesin Tanzania, can be undertaken to look further at the influence of different land tenure type (land title) to land investment (trees plantation) and conservation . This is because many studies about land and investment have been done in various countries such as Ethiophia, Ghana, kenya etc and not much in Tanzania. This will enable comparisons to studies in Tanzania for the purpose of learning from other countries.

The limitation faced by this study is that there are few studies that relate issues of land ownership and investment in Tanzania to compare the findings. With this study would be

nice to compare findings within the environment (in same country) as it creates more confidence.

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APPENDICES

Appendix I: VIF: Test For Multicollinearity

Variable	**Variance Inflation Factor (VIF)**
Primary	1.44
Lwealth	1.31
Dstph	1.27
Secondary	1.27

Hhsize	1.25
Dstpr	1.24
Age	1.2
Slightly	1.17
Sex	1.15
Pesticide	1.13
flat_t	1.12
Inorganic fertilizer	1.12
Dstpm	1.1
Organic fertilizer	1.1
Advice	1.09
Vsteep	1.09
Erosion	1.08
Labour	1.07
Ownplot	1.05
Acres	1.04
Tertiary	1.02
Mean VIF	**1.16**

Source: Own Computations

Appendix 2: Probit Regression

Probit regression Number of obs = 3633
Wald chi2(21) = 3.39
Prob> chi2 = 0.0000
Log pseudolikelihood = -2170.7948 Pseudo R2 = 0.0779

Trees	Coef.	Std. Err.	Z	P>z	[95 percent Conf Interval]	
Age	0.0068963	0.001597	4.32	0	0.003765	0.010027
Sex	-0.0594376	0.057428	-1.03	0.301	-0.1719939	0.053119

primary	0.2667781	0.055813	4.78	0	0.1573866	0.37617
secondary	0.2895915	0.098943	2.93	0.003	0.0956671	0.483516
tertiary	-0.2707254	0.327798	-0.83	0.409	-0.9131985	0.371748
dstph	-0.0697078	0.011935	-5.84	0	-0.0931005	-0.04632
Dstpr	0.0109727	0.01157	0.95	0.343	-0.0117039	0.033649
dstpm	0.0085156	0.002638	3.23	0.001	0.003345	0.013686
flat_t	-0.1229504	0.07525	-1.63	0.102	-0.2704385	0.024538
slightly	0.1799647	0.050027	3.6	0	0.0819145	0.278015
vsteep	0.4022358	0.113515	3.54	0	0.1797506	0.624721
erosion	0.1066757	0.069204	1.54	0.123	-0.0289614	0.242313
ownplot	0.6766359	0.072716	9.31	0	0.5341148	0.819157
organic	-0.3480304	0.075597	-4.6	0	-0.4961976	-0.19986
inorganic	-0.0473856	0.079416	-0.6	0.551	-0.2030381	0.108267
pesticide	0.2616183	0.078114	3.35	0.001	0.1085181	0.414719
hhsize	-0.0039806	0.008298	-0.48	0.631	-0.0202452	0.012284
advice	-0.0238199	0.054703	-0.44	0.663	-0.1310351	0.083395
Acres	0.0000999	0.001555	0.06	0.949	-0.0029486	0.003149
labour	0.0005216	0.001366	0.38	0.703	-0.002156	0.003199
lwealth	-0.0783642	0.014736	-5.32	0	-0.1072452	-0.04948
_cons	-0.5974444	0.333692	-1.79	0.073	-1.251468	0.056579

Source: Own Computation

Appendix 3: Marginal Effects After Probit

y = Pr(trees) (predict) = .33417815							
variable	**dy/dx**	**Std. Err.**	**Z**	**P>z**	**[95 percent C. I**		**X**
age	0.003	0.001	4.320	0.000	0.001	0.004	47.633
sex	-0.022	0.021	-1.040	0.301	-0.063	0.019	1.214
primary*	0.095	0.019	4.900	0.000	0.057	0.133	0.639
second~y*	0.110	0.039	2.840	0.005	0.034	0.186	0.068
tertiary*	-0.092	0.103	-0.900	0.370	-0.293	0.109	0.005
dstph	-0.025	0.004	-5.930	0.000	-0.034	-0.017	2.539

dstpr	0.004	0.004	0.950	0.343	-0.004	0.012	1.948
dstpm	0.003	0.001	3.230	0.001	0.001	0.005	7.582
flat_t*	-0.044	0.026	-1.670	0.094	-0.095	0.008	0.113
slightly*	0.066	0.019	3.570	0.000	0.030	0.103	0.343
vsteep*	0.155	0.045	3.440	0.001	0.067	0.243	0.040
erosion	0.039	0.025	1.540	0.123	-0.011	0.088	1.867
ownplot*	0.214	0.019	11.36	0.000	0.177	0.251	0.847
organic	-0.127	0.028	-4.590	0.000	-0.181	-0.073	1.900
inorganic	-0.017	0.029	-0.600	0.551	-0.074	0.039	1.902
pesticide	0.095	0.028	3.350	0.001	0.040	0.151	1.894
hhsize	-0.001	0.003	-0.480	0.631	-0.007	0.004	5.621
advice*	-0.009	0.020	-0.440	0.662	-0.047	0.030	0.231
acres	0.000	0.001	0.060	0.949	-0.001	0.001	2.408
labour	0.000	0.001	0.380	0.703	-0.001	0.001	5.866
lwealth	-0.029	0.005	-5.320	0.000	-0.039	-0.018	9.452

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Source: Own Computation