Assessing the Impacts of Land Holding Certificate on Soil Conservation Practices: The Case of Girar Jarso Woreda.Oromia,Ethiopia

Mesay Ashebir

A Thesis submitted to the

Department of Environment and Development

Presented in Partial Fulfillment of the Requirements for the Degree of Masters of Arts in Environment and Development

Addis Ababa University

Addis Ababa, Ethiopia

June 2012

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by Mesay Ashebir, entitled: Assessing the Impacts of Land Holding Certificate on Soil Conservation Practices: The Case of Girar Jarso *Woreda* and submitted in partial fulfillment of the requirements for the of Development Studies complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Examiner Degefa Tolossa Signature Degefa Date 28/06/2012

Examiner _____ Signature _____ Date _____

Advisor Feyera Senbeta Signature _____ Date 28/06/2012

Advisor _____ Signature _____ Date _____

Chair of the Department or Graduate program Coordinator

ABSTRACT

Assess impacts of land holding certificate on soil conservation practices: the case of Girar Jarso woreda. oromia, Ethiopia

Mesay Ashebir

Addis Ababa University, 2012

In Ethiopia, among many factors, tenure insecurity is considered as a main problem for land degradation. The objective of the study is to assess impacts of land holding certificate on soil conservation practices and the major constraints of soil conservation in the study area. Structured questionnaire survey, Key informant interview, direct observation and focus group discussion methods were applied to collect the necessary information from farm households. A total of 120 households were interviewed to collect primary data. Secondary data were also gathered from published and unpublished documents such as office records and reports, books, and related thesis works. Then, the data acquired analyzed using descriptive statistics techniques and binary logistic regression. Descriptive statistics were used to compare different categories of sample unit's in terms of means and percentage. Cross tabulation is used to compare and analyzed data gathered from households. The study result shows that soil conservation practices such as soil bund, stone bund, check dam and plantation of trees were seemed to be more influenced by land holding certificates. based on the analysis made on some selected variables, educational level, farm experience, family size and land renting have a significant impact on farmer's soil conservation practices so that it should be highly considered in the study area..

ACKNOWLEDGEMENT

First of all, I would like to thank the Almighty God since everything is done through the help of him. I would particularly like to extend my heartfelt thanks and appreciation to my advisor Dr. Feyera Senbeta, for his follow-up, devotion of his precious time, valuable suggestions, comments and systematic guidance to improve the content of this paper.

I would like to extend my thanks to my organization, Girar Jarso Agricultural Development Office and Cabinet member of Girar Jarso woreda for giving me a chance to attend the program of graduate studies. My special thanks reaches to Ato Alemu Tullu for creating conducive environment for me to start the programme in which I will not attend otherwise.

Honestly, I would like to thank Ato Tilahun Debele, for his consistent support by managing different condition and creating conducive environment during my education. All enumerators are also acknowledged for their efforts to get reliable information in time of interviewing farmers. I would like to extend my appreciation for all interviewed farmers for their giving me time and give the required information.

Above all, I am greatly value the support that I have got from *kebele* Development Agents and *kebele* administrators during data collection period in the study site. In addition, I would like to thank all of my key informants and group discussion participants who provided me the necessary information in the four study *kebele*. I am most grateful to my parents, W/ro Askale Tullu and all my family members for their consistent encouragement and moral support all the time.

Last, but not least, I would like to express my gratitude to all persons who were directly or indirectly involved to add their efforts to the accomplishment of this study.

Table of Content

Content

Table of Content v

List of Table.....viii

List of Figures viii

Acronyms.....ix

Chapter 1: Introduction.....1

1.1. Background.....1

1.2 Statement of the Problem.....3

1.3 Objectives of the Study.....5

1.3.1 General objectives.....5

1.3.2 Specific Objectives.....5

1.4 Research Questions.....6

1.5 Significance of the Study.....6

1.6 Scope of the study.....7

1.7 Limitations of the Study 7

Chapter 2: Review of Theoretical and Related Literature.....8

2.1 Concepts of land tenure.....8

2.2 Theoretical concepts of land tenure systems 9

2.3 Empirical studies of land tenure security.....10

2.4 Overview of Land Tenure Policy in Ethiopia.....16

2.5 Rural Land Registration and Certification Programme (RLRCP) in Ethiopia..... 21

2.6 Conceptual frame work description.....23

Chapter 3: Research Methodology.....24

3.1 Description of the Study Area.....24

3.2 Sampling methods and size.....27
3.3 Methods of data collection..... 28
3.3.1 Primary data collection 28
3.3.2 Secondary data collection.....29
3.4 Data Analysis.....30
3.4.1 Model development.....30
3.4.2 Description of the variables and their hypothesized effect 31
Chapter 4: Results and Discussions.....35
4.1 Demographic and Socio-economic Characteristics.....35
4.1.1 Age Status of Households and family members.....36
4.1.2 Marital status of the households..... 37
4.1.3 Education Status of Household.....38
4.1.4 Off-Farm Economic Activities.....38
4.1.5 Livestock production.....39
4.1.6 Crop production.....40
4.1.7 Land characteristics.....41
4.2 Land Registration and Certification.....43
4.2.1 Process of land registration and certification.....43
4.2.2 Perceptions of farmers after getting certificates 44
4.3 Impact of land holding certificates (tenure security) on Investments in Soil and land management 47
4.3.1 Tree plantation.....48
4.3.2 Construction of bunds.....49
4.3.3 Construction of check dams.....50
4.3.4 Construction of cut off drains.....51

4.4 Empirical analysis of the factors influencing the practice of soil conservation Practices.....52

Chapter 5: Conclusions and Recommendations..... 56

5.1 Conclusions.....56

5.2 Recommendations.....58

References 59

Appendix I 68

Appendix II 77

Appendix III.....78

Glossary.....80

List of Tables

Table 1: Distribution of sample household heads by kebeles.....28

Table 2: summery of the variables used in the logistic regression model.....34

Table 3: General Characteristics of the sampled households.....35

Table 4: Martial status of the households 37

Table 5: Educational status of household heads..... 38

Table 6: Shows the number of livestock holds by HH.....39

Table 7: land holding size in the study area.....41

Table 8: shows Tree plantation before and after land certificate through cross tabulation.....49

Table 9: shows Constru ction of soil and stone bunds before and after land holding certificate through cross tabulation.....50

Table10: shows Construction of check dams before and after land certificate holding through cross tabulation.....51

Table 11: shows Construction of cut off drains before and after land holding certificate through cross tabulation.....51

Table 12: Parameter estimates of the binary logistic regression model..... 53

List of Figures

Figure 2.1 Conceptual framework 23

Figure 3.1 Map of the study area.....26

Figure 4.1 Age status of the households.....36

Figure 4.2 Major Constraints of crop production.....40

Figure 4.3 Construction of soil and stone bunds.....52

Abbreviations

CSA	Central Statistical Authority
EEPRI	Ethiopian Economic Policy Research Institute
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
FFW	Food for Work
GDP	Growth Domestic Product
Ha	hectare
HH	Household
^{o}C	degree Celsius
Km	kilo meteres
mm	mill meter
masl	meters above sea levels
MLRA	Ministry of Land Reform and Administration
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PSNP	Productive Safety Net Programme
RLRCP	Rural Land Registration and Certification Programme

SLM	Soil and land management
SWC	Soil and water conservation
USAID	United States Agency for international development
WAO	Woreda Agriculture Office
WFEDO	Woreda Finance and Economic Development Office

CHAPTER ONE

INTRODUCTION

1.1. Background

Land is one of the most important assets of the people throughout the whole world especially for the rural and urban poor whose life basically relies on agriculture (USAID, 2007). But this valuable property is being degraded due to soil erosion and nutrition depletion (Amsalu and Graaff, 2007). In most developing countries, the major factor for land degradation were improper and unsustainable land management due to land tenure insecurity, limited access to credit and limited education (IFPRI *et al.,* 2005). Land degradation is considered as a major global issue due to its adverse impact on agricultural productivity and sustainability (Hagos and Holden, 2006).

Like other developing countries, land degradation is a major environmental problem in Ethiopia. Currentl y, Ethiopian ag riculture is the predominant sector of the economy accounting for approximately 45% of the GDP, 85% of the employment and the major share of the export earnings (Abegaz and Bekure, 2009). However, the productivity of this sector is being threatened due to unsustainable land management practices.

Studies (USAID, 2000) have shown that the average annual rate of soil loss in Ethiopia is estimated to be 12 tons/ha/year, and it can be even higher on steep slopes with soil loss rates greater than 300 tons/hectare/year or 250 mm/year, where vegetation cover is scant . According to Girma (2001), Ethiopia losses annually 1.5 billion Metric tons of top soil

from the highland by erosion. The problem is particularly severed on cultivated marginal and slopping land because such areas are generally susceptible to soil erosion (Tadesse and Belay, 2004; Green land et al., 1994).

In the Ethiopian highlands soil degradation is caused by a combination of factors such as high population pressure and many other physical and socio-economic reasons (Bewket and Sterk, 2002). Continuous cultivation with little amendment for the soil, and widespread use of dung and crop residues for household energy has substantially contributed to the loss of organic matter (Amsalu, 2006). Because most farmers are poor and operate at subsistence level, investment for intensification of agriculture is not well developed in the country. This has created a vicious circle of low productivity, whereby land degradation reduces the production potential of the land and this, in return, makes it difficult for farmers to produce enough and invest in the land.

Furthermore, recent studies (e.g., Bekele and Drake, 2003; Belay, 2004) on Ethiopian agriculture found that low technical inputs, outmoded farming practices, as well as the degradation of the environment and its productive potential are the underlying reasons for poverty, food insecurity and increased vulnerability to drought in rural Ethiopia. Moreover, the historical and changing pattern of land ownership –mostly government controls has led to low levels of investments on due to insecurity of land (Berry, 2003). In recognition of this problem, the Government of Ethiopia started the process of Rural Land Registration and Certification Programme (RLRCP) in 1998 which was regarded as a milestone in providing land tenure security (Teshome, 2006).

However, the influences of rural land certification on land investments especially soil conservation activities are not much researched and little studies have been undertaken in the study area. Hence, it is important to conduct the research to fill the knowledge gap about the impacts of land holding certificate on soil conservation in the study area.

1.2. Statement of the Problem

Land tenure security is believed to be important in improving investment in land, land management and sustainable use of natural resources. However, the impacts of land certification on proper utilization of land and improving investment is debatable (Asefa, 2010).Furthermore, according to Rahmato (2003), one of the reason for the poverty situation and unsatisfactory agricultural development is the absence of sufficient investment; and this is due to lack of tenure security.

Deininger (2003) notes that property rights affect economic growth in a number of ways. *Firstly,* secure property rights will increase the incentives of households and individuals to invest, and often will provide them with better credit access, something that will not only help them make such investments, but will also provide and assurance substitute in the event of shocks. *Secondly,* it has long been known that in un mechanized agriculture, the operational distribution of land affects output, implying that a highly unequal land distribution will reduce productivity. Even though the ability to make productive use of land will depend on policies in areas beyond land policy that may warrant separate attention, secure and well-defined land rights are key for household asset ownership, productive development, and factor market functioning.

Land tenure and property rights affect the application of technologies for agricultural and natural resource management. Secured property rights give sufficient incentives to the farmers to increase their efficiencies in terms of productivity and ensure environmental sustainability. It is natural that without secured property rights farmers do not feel emotional attachment to the land they cultivate, do not invest in land development and will not use inputs efficiently.

Land degradation in the form of soil erosion, sedimentation, depletion of nutrients, deforestation and overgrazing are basic problems facing farmers in the Ethiopians high land, and this limits their ability to increase agricultural production and reduce poverty and food insecurity. The integrated process of land degradation and increased poverty has been referred to as the ''downhill spiral of un-sustainability '' leading to the 'poverty trap' (Green land et al., 1994). The immediate consequence of land degradation is reduced crop yield followed by economic decline and social stress.

The Ethiopian highland have been experiencing declining soil fertility and severe soil erosion due to intensive farming on steep and fragile land (Amsalu and de Graaff, 2006). Hurni (1988) estimates that erosion is most severe on cultivated lands, average 42 tons per ha per year on currently cultivated lands. The problems of population increase on the one hand and the limited availability of arable land coupled with severe soil depletion on the other makes intensification of agricultural production while maintaining the resource base imperative .

Despite the severity of the problem, however, it is only recently that land conservation has received political attention in the country. Since the 1960s, various conservation

strategies have been introduced to enhance agricultural development and rural livelihoods (Kelly and Scoones, 2000). Recognizing land degradation as a major environmental and socio-economic problem, the government of Ethiopia has made several interventions.

Among the interventions, land registration and granting land holding certificate to land holders have recently become one of the government interventions in Ethiopia. Based on land administration laws, some regions like Oromia started the implementation of rural land certification program for seven previous years (Deininger, 2008).

Similarly, majority of the farmers in the study areas have got land holding certificates in the previous year's .However, the perception of farmers towards land holding certificates and its impacts on swc is not well known that it is important to conduct the research.

1.3.Objectives

1.3.1. General objectives-

to assess the impact of rural land holding certificate on land investment in Girar Jarso woreda.

1.3.2. Specific objectives:

- To assess the attitude of the farmers on the significance of land holding certificate in the study area.
- To analyze the impacts of land holding certificates on soil conservation practices in the study area.
- To examine the determinants of soil conservation practice in the study area.

1.4.Research questions

- What is the attitude of farmers on the significance of land holding certificate given to them?
- What is the impact of land holding certificates on soil conservation practices in the study area?
- What are the major constraints of soil conservation practice in the study area?

1.5.Significance of the study

As different studies showed that, the influence of land holding certification on land management particularly soil conservation measures on farm is not understood well for various reasons. The finding of this study helps to know the impacts of land certificate on soil conservation measures in the study area.

In other words , the study have an important contribution which could be used as a guide by local actors or development agents to formulate area specific and household centered alternative strategies and action plans to promote rural household capacity to ensure the different aspects of livelihood security through a sustainable use of soil resources.

1.6. Scope of the Study

Since it is not possible to cover the whole aspects of the study area with the available time and resources, the study size was limited to manageable size so that it was focused on the representative sites in Girar jarso *woreda* to see the impacts of land holding certificate on soil conservation measures.

1.7 limitation of the study

In Girar Jarso woreda, there are about14, 455 households and such a large size may require a large number of samples to be taken in order to paint the real picture of the situation. However, due to budget and time constraints the study considered only on four purposively selected rural *kebeles* to draw a sample of households.

CHAPTER TWO

REVIEW OF LITERATURE

2.1. Concepts of Land Tenure

Land tenure security is "the individual perception of his/her rights to a piece of land on a continual basis, free from imposition or interference from outside sources, as well as the ability to reap the benefits of labor or capital invested in land, either in use or upon alienation"(Roth and Haase, 1998).

FAO (2002) has defined the term "land tenure" as: "the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land… [It] is an institution, i.e., rules invented by societies to regulate behavior regarding on how land is accessed and used."

Similarly; Middleton has defined land tenure as cited by (Yigremew Adal, 2002) " a system of relations between people and groups expressed in terms of their mutual rights and obligations with regard to land."

Ogolla and Mugabe, on the other hand, define land tenure as cited by (Gudeta Sefiu, 1991) "the methods by which individuals or groups acquire, hold, transfer or transmit property rights in land."

tenure security implies the ability of a farmer to cultivate a piece of land on a continuous basis free from imposition, dispute or appropriation from outside sources, as well as the

ability to claim returns from input or land improvements while the farmer operates the land and when it is transferred to another holder.

Therefore, as can be discerned from the foregoing proposition, tenure security refers to the situation in which farmers practically enjoy full rights of use and appropriation of the returns from the land through being protected from different impositions and interferences from others. It is state of affairs in which farmers are guaranteed to exercise their holding rights freely without any hindrance from any quarter. Thus, tenure security requires guaranteeing use rights, which include permanent, exclusive enjoyment as well as free transferability.

2.2. Theoretical Concepts of Land Tenure Systems

Land tenure system is often considered as a milestone for the adoption of sustainable land management practices and for shaping of the farmers" land use decisions. That is why the policy makers, government and non-government officers, the private sector, the donor agencies, researchers and public have given a major attention on this issue of tenure security (EEPRI, 2002). When there is tenure insecurity, the risk of losing land will obstruct famers from making investments in the field even though these investments provide higher benefit in their productivity (Deininger and Jin, 2006).

Conceptually tenure insecurity is associated with the lack of well defined property rights. Property rights in terms of land is defined as "the right to occupy, enjoy and use; to restrict others from entry/use; to dispose, buy, or inherit; to develop or improve; to cultivate; to sublet; to realize financial benefits; and to access services in association with

land". Property right helps to resolve conflicts, defend rights, administer and manage land resources which are considered as a foundation for economic growth (USAID, 2007).

According to Deininger (2003), secure property rights will increase the incentives to invest on land and also provide them with better credit access which will help them make such kind of investments. There are many evidences to show that the secure and easily transferable property rights are major factors to make higher level of investments in terms of SLM, access to credits and allow economic diversification and growth. Land rights also enhance the gender equality and bargaining power by women, improve governance, reduce conflict potential, and lower transaction costs for productivity-enhancing land transfers through either rental or sale (Deininger *et al.*, 2008).

The lack of property rights and insecurity of tenure often made farmers not to care much about the land use, investments on SLM and use of input efficiently and focus mainly on the short term profit which may result in land degradation (Tenaw *et al.*, 2009). Many studies are carried out to show the link between tenure security and investments in terms of land management. A study carried out in China, Thailand, Latin America and Eastern Europe showed that more secure land tenure had a positive impact on investments and land values in rural areas (Deininger *et al.*, 2009).

2.3. Empirical Studies of Land Tenure Security

A study made by Deininger and Jin (2006) also revealed that transfer rights to land tenure security enhanced farmers to make investments on land. Similarly, results of studies in African countries about the effects of tenure security, land rights, land disputes, and land

titling showed that stronger land rights and presence of land titles are often linked with a positive impact in making certain types of investment, for example, tree planting, fencing, and manuring (Placea, 2009).

Perceived tenure security plays an important role for making investments in land management, land improvements and adopting best cropping system which is possible through land titling. In Amhara region of Ethiopia, land titling due to distribution of certificates has increased the perception of tenure security among farmers which improved tree plantation and other SLM activities and also the incidence of land disputes has declined due to the proper land demarcation (Palm, 2010 and Deininger *et. al.*, 2009).

Gebremedhin and Swinton (2003) found that in Northern Ethiopia, farmers" perceived tenure security was positively linked with investments on long term durable soil conservation structures like stone terraces. Long-term investments in stone terraces are associated with secure land tenure, whereas short-term investments in soil bunds are strongly linked to insecure land tenure.

In the same way, study made by Holden *et al*, (2009) to know the HHs" perceptions about the low cost land certification program, which was implemented on a broad scale in the Tigray region of Ethiopia in the late 1990s, also showed that this program contributed to increasing tenure security and reducing land disputes among the households. The results from the farm plot panel data set covering the year before implementation of certification and up to 8 years after certification also showed that land certification has

contributed to increased investments in trees, better management of soil conservation structures and enhancement of land productivity.

Another study made in Tigray region of Ethiopia also showed that people having certificates are more interested in making long term land-related investments and also the high use of chemical as well as organic fertilizers (Ghebru and Holden, 2008). Similar is the case for Kenya where tenure security plays an important role for the adoption of soil conservation practices (Kabubo-Mariara, 2007).

Apart from the land tenure, other factors which influence directly or indirectly to the farmers" investments in land management are also taken into consideration which includes household characteristics, livestock characteristics, land characteristics and perception of farmers about the erosion and soil degradation even though those factors are not shown in the framework.

Dessalegn (1995 cited in Taye (1999), stated about relationship between land tenure system and sustainable land use that "land tenure arrangements influence farmers' land management practices and investment plans". Similarly, Dawn and Reya (1998 cited in Taye, 1999) conformed that "improved ownership security can promote long-term land improvement efforts and ownership security of land users (Besley 1995; Sjaastad and Bromley 1997). Therefore, if land certification can enhance tenure Security it may enhance investment. In turn, tenure security may reduce conflicts over land, which may enhance the positive effects of tenure security on land productivity (Deininger and Castagnini 2006). In addition, property rights may contribute to better access to credit if

land can be used as collateral and can contribute to land market development such that land will be reallocated to more efficient producers, which may stimulate investment on the land.

Land titling or registration is widely believed to improve efficiency of land use and agricultural production by increasing farmers' incentives to adopt new technology, on-farm investment, and soil conservation practices (Feder and Nishio, 1999; Rahmato, 2004). The motivation for the government's initiative seems to have come from this imperative: boosting farmers' sense of security, which, in turn, is expected to encourage investment on erosion reducing and land quality enhancing technologies (FDRE, 2005).

From the literature (Feder et al., 1986; Feder et al, 1988; Besley, 1997; Feder and Nishio, 1999; Deininger, 2004), we gather that secure property rights in land are generally considered to be a precondition for economic growth and development for three reasons: (i) land titles have positive effect on land tenure security and provide investment incentives for owners to undertake land-related investments; (ii) land titling reduces the transaction costs in land markets thus helping increase cost and allocate efficiency; and (iii) formal land titles improve access to institutional credit by creating collateral value for land.

Land tenure security, which accrues from land registration/titling, removes uncertainties on whether or not land owners can reap the benefits from any long- term investment they make such as on-farm soil and water conservation, water harvesting structures and trees. With positive expectations about the exclusive enjoyment of any returns earned from investment, landowners develop interest in investing in land improvements as well as

making land based investments in agriculture. This boosts demand for investment which in turn increases demand for complementary inputs including labor and agricultural inputs (including capital). There are empirical evidences in support of the positive impact of land registration on investment *(Feder et al., 1986; Feder et al, 1988; Feder and Nishio 1998; Deininger, 2004).*

Land registration provides the necessary information to overcome the asymmetries in information available between two contracting parties to a land transaction. Consequently, land registration plays an important role in reducing land transaction costs and thereby raising the efficiency of whichever planned investment. This may enhance efficiency in land use by creating a market in land and/or increases market efficiency, thereby enabling property rights in land to move from less efficient to more efficient users of land. There is emerging evidence that land registration contributed to increased land rental market participation in Ethiopia (Holden et al. 2007).

Jansen and Roquas (1998) explain that private ownership of land promotes adoption of new technologies, and soil conservation practices. Maxwell and Wiebe (1999) mention that greater land tenure security increases farmers' demand for land improvement by increasing their confidence that they will benefit from it in the long run. Todaro and Smith (2003) agree that land tenure security can lead to improved living conditions for the poor and increased agricultural investment.

A combination of an increase in investment demand and credit supply associated with land registration leads to more investment, greater use of variable inputs, higher output per unit land area, greater income and higher land values. Feder and Nishio (1998) found

that land registration led to: higher land values in Thailand, Philippines, Indonesia, Honduras, Brazil and Peru although other have found hardly any linkage between land titling and better credit market performance, particularly in Africa (Roth et al., 1994).

In contrast to these findings, there are certain other results which do not show the positive link between tenure security and land related investments. The study carried by Zikhali, 2008 in Mashonaland central province in Zimbabwe to investigate the impact of Zimbabwe"s fast track land reform program on perceptions of tenure security and investments on land management showed that the program had created some tenurial insecurity among the beneficiaries and had adverse impacts on soil conservation practices. It is assumed that this program might have failed to provide tenure security to the farmers who had got land under reform program (Zikhali, 2008).

Goeschl and Igliori (2006) indicate that property rights' arrangements can not generally guarantee efficient management of natural resources.Holden and Yohannes (2002) found no evidence of tenure insecurity having a negative effect on investment in trees in southern Ethiopia, whereas poverty had a significant negative impact on such investments. In the same way, the survey conducted in Ghana, Rwanda and Kenya also showed that land registration didn't play a major role on productivity, land improvements or access to credits. Rather physical infrastructures, effective credit systems and marketing institutions had a greater impact (Migot-Adholla, 1991).

There are also some cases in which investments are made to increase tenure security rather than a result of higher level of tenure security. A study made by Neef (2001) in

four countries (Niger, Benin, Thailand and Vietnam) suggested that tenure insecurity does not always led to decreasing investments in land. The uncertainty of land rights can also enhance tree planting and adoption of soil conservation practices. The main reason behind this is farmers" belief that if they make these types of investments, then it will help to obtain tenure rights and as such increase long term tenure security (Neef, 2001). The same case is also found in Burkina faso where land- related investments are made to increase tenure security rather than as a consequence of more secure rights (Brasselle *et al.,* 2002). However, in context of Ethiopia, it is more likely that land security promotes investments rather than investments are made to increase tenure security (Negatu, 2005).

The above explanation shows that the existing literature on the empirical analysis of the link between land tenure and investment on SLM has mixed results. In Ethiopia, most of the studies done in Amhara and Tigray regions showed that land titling due to certificates provide tenure security among farmers which motivate them to make different kinds of SLM practices.

2.4. Overview of Land Tenure Policy in Ethiopia

Land is the basic socio-economic asset in Ethiopia in general and Oromia Regional State in particular. It has been emphasized that the way land rights are defined influences how land resources are used and economic growth. Historically, in Ethiopia, the north and south regional distinction was reflected in land tenure differences. The patterns of land tenure policy and property rights have been dependent mainly on policy exercised by

three different political regimes since the beginning of the 20th century namely: the imperial, the Derg and the current regimes.

2.4.1. Pre-1974 Period

Until the l974 revolution, Ethiopia had a complex land tenure system. The nature of the land tenure arrangement comprises private, state, church land, kinship and other forms. This type of land tenure system adopted by the Ethiopian Empire is described as one of the most complex compilations of different land use systems in Africa (Deininger, 2008).

The major problems of the Pre-1974 land tenure in Ethiopia include exploitative tenancy, land concentration and utilization, tenure insecurity and diminution and fragmentation of holdings. Tenure insecurity that was considered as one of the main limitations of pre-revolution reform land tenure system is manifested in various forms ranging from endless litigation over land rights to complete eviction from holdings. Besides, there were problems of institutional inadequacy and the land owned by the absentee land lords was underutilized. These were the most important obstacles to the country's development in general. The privatization of land in the south which was continued at renewed great speed and force in the period of three-and-half decades made important cause of political grievances and leading to the 1974 revolution that resulted in the overthrow of the regime once and for all (EEPRI, 2002).

2.4.2. The Derg Period

The Derg, in its land reform in 1975, appropriated all land and abolished the diverse tenure arrangements in the imperial regime. The land reform destroyed the feudal order; changed landowning patterns, particularly in the south, in favor of peasants and small landowners; and provided the opportunity for peasants to participate in local matters by permitting them to form associations. Landlords lost their land rights and land was distributed to individual households, with household system size being the main criterion for land allocation. Under Proclamation No.31/1975, all rural lands were nationalized and private ownership of rural lands was totally abolished.

The provisions of the Proclamation (No. 31/ 1975) include: public ownership of all rural lands; distribution of private land to the tiller; prohibitions on transfer-of-use rights by sale, exchange, succession, mortgage or lease, except upon death and only then to a wife, husband or children of the deceased; and in the case of communal lands, possession rights over the land for those working on the land at the time of the reform. The power of administering land was vested in the Ministry of Land Reform and Administration (MLRA) through Peasant Associations at the grassroots level (Hoben, 1995).

In general, diminution and land fragmentation of holdings, tenure insecurity, land degradation and inefficient allocation of land by the way of restrictions on land transfer and to some extent lack of appropriate land use and administration were among commonly cited problems in relation to the land policy of the Derg Regime.

2.4.3. Land Tenure System Since 1991

The existing government announced the continuation of the land policy of the Derg Regime under the Constitution of 1995 that approved and confirmed the state ownership of land in Ethiopia. The present government's land policy, unlike that of the "Derg", is enshrined in the Constitution. Accordingly, the government effectively eliminated land policy as a variable instrument that could be used to address the changing circumstances that affect the rural economy. Article 40 of the 1995 constitution (which provides for property rights) states that the right to ownership of rural and urban land as well as of all natural resources is exclusively vested in the state and in the people of Ethiopia (Ahemd,2002). The present Ethiopian government continues to advocate state ownership of land whereby only usufruct rights are bestowed upon landholders. The user's rights exclude the right to sell or mortgage the land. This was to protect the rural peasants from selling off their land to wealthy individuals leaving them landless and without source of livelihoods. The first Federal Land Administration and Use Law were enacted in July 1997 which is referred to as "Rural Land Administration and Use Proclamation No. 89/1997." This Proclamation has laid down the fundamental principle uphold by the Constitution of the Federal Democratic Republic of Ethiopia that land is a common property of the Nations, Nationalities and Peoples of Ethiopia which shall not be subject to sale or to other means of exchange. It empowers Regional States to enact their own laws to administer rural lands within the framework of the general principles provided in the federal law.

Rights and obligations of Rural Landholders

Land Use Rights

In the first place, the major rights of landholders specified under Art.6 (1) of the Proclamation, among others, include: the right to use one's holding without any time limit, the right to lease out, the right to transfer use right over one's parcel of land to one's family members through inheritance or donation, the right to acquire property produced thereon and the right to sell, exchange and transfer such property and the right to claim compensation up on the expropriation of the holding rights for public purposes.

Pursuant to this law, any holder has the right to rent out up to half of his/her total holding for three years if modern farming technology is utilized. Nevertheless, agreements to rent rural holdings won't be valid unless approved and registered by the Bureau.

Obligations of Rural Land Holders

The title of use-right is not only the bundle of rights without any obligation. There are certain obligations imposed on the use right holder by operation of law or by lease agreement based on the source of the title. Some of the obligations imposed by law on the user include: obligation to proper management of rural land, obligation to proper management of farm land, obligation to proper management of grazing land and obligation to proper utilization of lands. Proclamation No.130/2007 incorporates provisions of obligations here and there. For instance, the proclamation under Article 6 (16) provides for the main obligations that must be fulfilled by all rural land users to continue exercising use rights over their holdings. In the first place, any rural land user

who fails to conserve his holdings may lose his/her holding rights. Secondly, any rural land user who leaves his holdings uncultivated or unused for two consecutive years would be deprived of his/her use rights. The Proclamation contains provisions that provide for proper management and conservation of the land by abstaining from activities that exacerbate soil erosion, forest clearing and plough sloppy land and refraining from planting tree species that may cause damage to the land and eradicate weeds that cause harm to land. In the third place, any rural land user who willfully abandons his/her holding must lose his holding rights.

2.5. Rural Land Registration and Certification Programme (RLRCP) in Ethiopia

In Ethiopia, policy makers had been facing a problem of balancing the demand for the continued redistribution of land to the young, landless families and ensuring the farmers that their land rights are secured so as to encourage them in making long-term investments in the land .A large number of land redistribution that occurred in the previous time created a great sense of tenure insecurity. So the Ethiopian Government, in its Poverty Reduction Strategy, recognized the importance of tenure security as a necessary component of a plan to increase land productivity and had begun the process of RLRCP since 1998 in order to provide land title to the farmers (Teshome, 2006). In the case of Ethiopian land policy, registration refers to "a process of recording rights on land which provides safe and certain foundation of acquisition and disposal of rights in land, where disposition includes transfer, leasing and mortgage (investors) of the holding rights (Kanji *et al.*, 2005). Also, land certification is defined as an attempt by the government to

provide security of tenure and protect the use rights of land holders by registering their holding and issuing certificate that are further guarantee to holders from facing another loss through land redistribution at least for a period of 20-30 years (Nzioki,2006).The Ethiopian land certification provides farmers rights to use, rights to inherit, rights to obtain -compensation for investments on land in the case of loss of land and rights to rent their land for a limited time period. However, in a country like Ethiopia where there is a history of changing tenure system and tenure insecurity, the provision of land certificates is s step towards improvement. Selling and mortgaging of land is prohibited (Holden *et al.*, 2009).

2.6. Conceptual Frame Work Description

As Figure 2.1 shows, soil conservation activities are influenced by different factors such as demographic factors, Scio-economic factors and institutional factors. the demographic factors like age and family size were hypothesized to influence the practice of soil conservation activities. Also ,socio economic factors such as education of the household level, Farm experience ,Access to information, Farm size, Contacts to DA and Land renting influences soil conservation measures positively or negatively in the study area. Moreover ,the institutional factors of land holding certificates influences the soil conservation practices which can be seen from different perspectives such as land holding certificates increases tenure security, reduce land disputes and collateral credit facilities which enable farmers to invest on their land. land holding certificates increase the sense of ownership that farmers establish different physical and biological conservation practice such as construction of soil and stone bunds, planting of perennials trees and application of organic manures on their land to increase productivity of land.

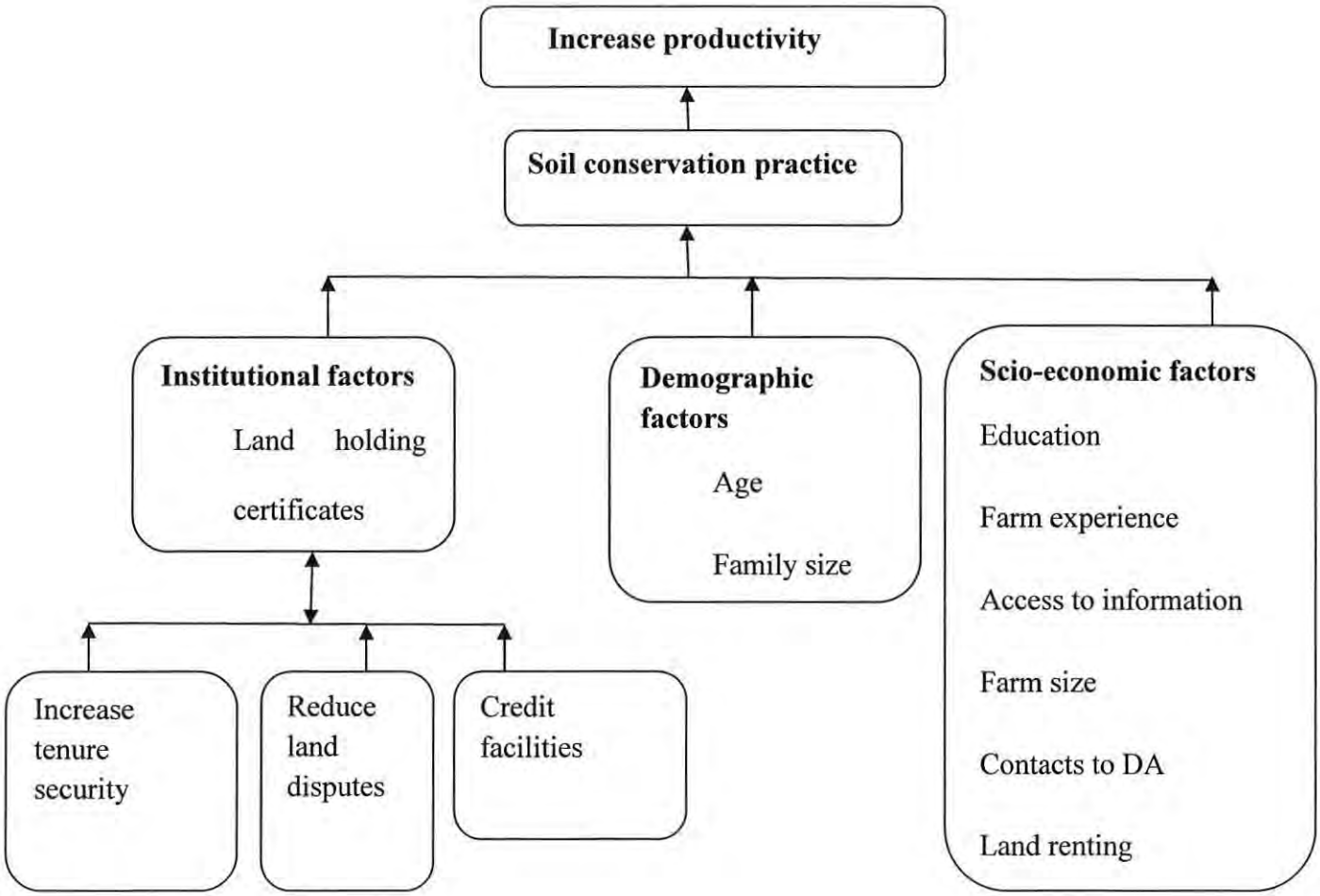

Figure 2.1 Conceptual framework of the hypothesized factors soil conservation practices.

Source: - Modified from Sabita Giri (2010).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Description of the Study Area

Girar Jarso *woreda* is one of the thirteen *woredas* of North Shewa Zone, Oromiya National Regional State. The *Woreda* lies along the highway to Addis Ababa to Debre Markos at a distance of 112 km from Addis Ababa. It shares border with Amhara Region in the North, Yaya Gullalle *woreda* in the East, Debre Libanos *Woreda* in the South and Degem *Woreda* in the West. The total area of the *woreda* is about 42,763 ha. The altitude of the *Woreda* ranges from 1300 to 3419 meters above sea level. Geographically, the *Woreda* occupies $9^0$35'-$10^0$00'N latitude and $38^0$39'-$38^0$39'E longitude. The Woreda experiences the mean annual rainfall of 1200mm and with the minimum and maximum rainfall of about 1115mm and 651mm. Temperature of the *woreda* ranges from a minimum of 11.5^0c to a maximum of 35^0c (*WFEDO*, 2010).

According to census results of 2008, the total population of the *woreda* is 67,298. The number of female and male population is 32,836 and 34,462, respectively giving sex ratio 49:51. The average population density of the *woreda* is 157 persons per km^2 (CSA, 2008). Girar Jarso *woreda* consists of people with few ethnic groups, Oromo and Amhara. The majority of the people in the area belongs to Oromo and speaks Afan Oromo while the rest belongs to the Amhara and speaks Amharic (WFEDO, 2010). According to data obtained from survey result, 75 % of the respondent belongs to Oromo while 25 % belongs to Amhara. Commonly, people living in *dega* and *woina dega* areas

speak Afan Oromo while Amharic is spoken by people living in *kolla* areas. With regard to religion, majority of the populations of the *woreda* are followers of Orthodox Christianity. According to WAO (2010), the land feature is characterized by flat land, mountains, sloppy to steep sloppy and gorges. About 36 % of the land area is flat while the proportion of the total area that is considered as sloppy is about 33 %. The remaining 31% is classified as mountainous and gorges. Agro-ecologically, the *woreda* is categorized into three: *Dega, Woina-Dega* and *Kolla* constituting 52%, 41% and 7% of the total area of the *woreda* respectively. The types of soil in the study area are black soil 38%, red soil 38%, sandy soil 11%, and other type of soil is 13% (*WFEDO*, 2010)..

With regard to land use pattern, cultivated land covers the largest share, 71 % while grazing land is the second largest land use pattern that covers 11 %. About 8 % of the *woredas'* land area is unusable land which is neither cultivated nor grazed this includes, rugged topography, mountainous and exhausted degraded land areas. The remaining proportions include forest areas and settlement areas i.e., built up and leased out land for investors like dairy farm and poultry farm cover 4 and 6 %, respectively. Data obtained from survey result shows that, no farmland is fallowed due to shortage of cultivated land hence the households put all land under cultivation. According to the informants in Weddesso Amba *kebele*, fallowing land for a minimum of a year is common in *kolla* areas before a decade. But currently due to shortage of farmland no one is fallowing his/her farmland though the productivity of farmland is declined.

Regarding to land certification, 85% of the farmers (11,357 male and 3,098 female) have got land holding certificates in the woreda since 2005 which shows majority of the

farmers have got their own land holding certificates (Girar Jarso Rural Land Administration and Environmental protection office, 2011).Also, in the *woreda* there is traditional soil and water conservation practices being undertaken on farm lands with few conservation activities on grazing land and communal lands.

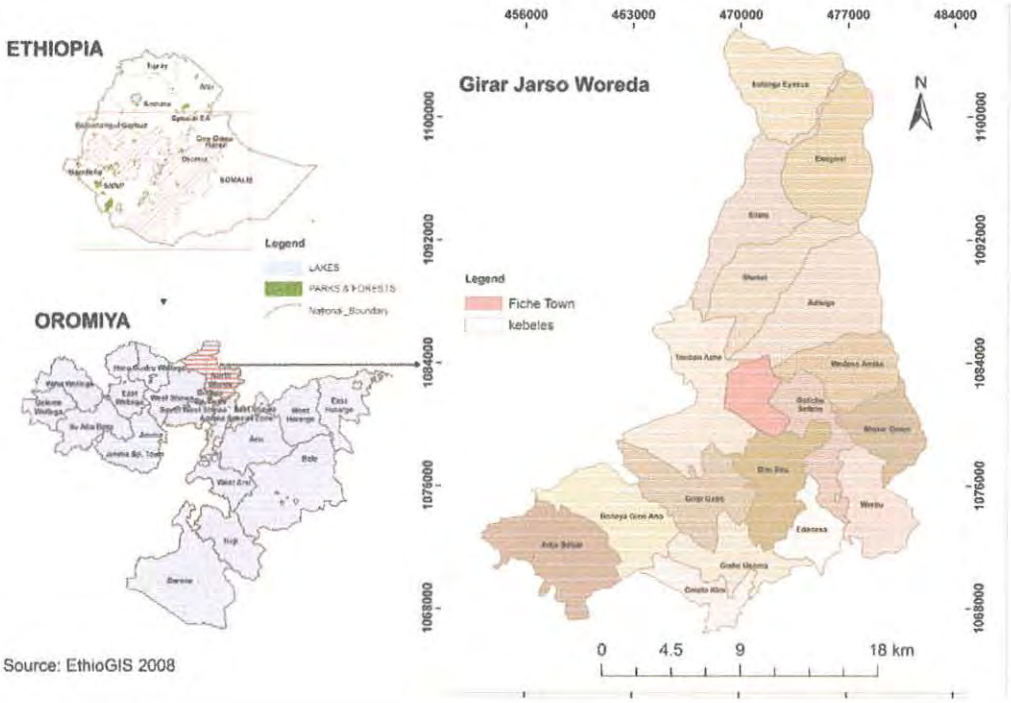

Fig. 3.1. Map of Study Area.

3.2. Sampling Methods and Size

A cross sectional design was adopted whereby data collection was done at one time and the research was also conducted based on observational studies. The study area was selected purposefully so as to see the impacts of land holding certificates on soil conservation practices and the factors associated with soil conservation measure. Two stage sampling procedure was employed to select rural households for the study .Firstly; four kebeles were selected from the complete list of 17 *kebeles* using simple random sampling procedure for the purpose of this study. Following the selection of the *kebeles*, sampling frame was established by taking the complete list of households who have got land certificates before three years from the record available in the *Woreda* Land Administration and Environmental Protection Office. After getting the total number of household heads in the selected *kebeles*, approximately 12% (120) of the total households were taken randomly. The sample size in each selected *kebeles* was made in proportional to the total household heads found in each *kebeles*. Finally, based on the list of all farm households selected in the *kebeles* and determined sample size, a total of 120 households were selected using simple random sampling methods for the study.

Table :1 Distribution of sample household heads by *kebeles*

No.	Kebeles name	Total HH **	Sample size*
1	Illamu Arjoo	411	49
2	Amato Kiroo	166	20
3	Gishe Usmani	204	25
4	Wadesso Amba	219	26
	Total	1000	120

Note: * obtained depending on the above sampling procedure

** farmers having land holding certificates before three years obtained from Woreda Land Administration and Environmental Protection Office

3.3. Methods of Data Collection

3.3.1. Primary data collection methods

Questionnaire survey: Structured questionnaires were used to collect the primary data from the sampled households. The questionnaires were designed to fit into the objectives of the study and translated to local language. Data collection was done from February to April 2012 with the help of the enumerators. Before starting the survey, the enumerators were briefed about the purpose of the study and with the questionnaires. The questionnaires include information regarding the household characteristics, livestock characteristics, land characteristics, land registration and certification, farmers' perceptions after getting certificates, investments that the farmers are making in their field for soil and land management and the relation between the soil conservation practice and the land certificates. Pre-testing of the questionnaire was conducted before conducting a real survey in order to check its reliability and validity and as an exercise to introduce the questionnaire to local enumerators.

Focus Group Discussion: focus group discussions with open- ended questions were done in each *kebeles* to get the better understanding of the issues in the households. Each group has a member of eight to ten (8-10) farmers who includes young, old and both male and females.

Key Informant Interview: semi- structured interviews were conducted with a certain number of key informants in the study area. Three key informants included the experts from the Woreda of Agricultural Office such as Soil and water conservation experts, Development Agents, Woreda Land Administration and Environmental Protection experts. The questions included some information regarding the problems in the area associated with land management and how the land security (land certification) is helping them to solve these problems.

Field Observation: farmers' fields were also visited after conducting the survey so as to see the different kinds of soil and land management practiced in their fields.

3.3.2. Secondary Data Collection

The secondary data sources were collected from published and unpublished documents such as office records and reports, survey reports, books, and related thesis works.

3.4. Data analysis

In order to attain the objectives of the research, both quantitative and qualitative analysis were used using SPSS software.

Descriptive statistics was used to compare different categories of sample unit's in terms of means, standard deviation and percentage. Frequency analysis was used to list each variable and to tabulate the number of times each value of a variable occurs and also to show the distribution of the responses of variable. Cross tabulation was also used to compare the qualitative data which associated with soil and water conservation practices undertaken before and after land certificates.

The econometric analysis of binary logistic regression was used to test the significance of selected variables which influence the soil and water conservation practices.

3.4.1. Model development

Binary logistic regression was used for analyzing the significant differences between categorical variables and also to examine the possible linkage between dependent variables which is soil conservation activities and independent variables (Garson, 2011). It describes the relationship between a dependant variable and a set of independent variables and predicts the factors influencing farmers involving in soil conservation practice.

The functional form of binary logistic regression model can be given as:

$$\ln [p/ (1-p)] = a+bX1+cX2 \quad \text{..... (i)}$$

Where: *In* is the natural logarithm, *p* is the probability of an event occurring, *a*, *b* and *c* are coefficients, and *X*1 and *X*2 are the independent variables.

Rearranging (i): p=1/ [1+exp (-1*(a+bX1+cX2……..))]…….. (ii)

With the functional form in (ii), the denominator approaches a value of 1 as the value of *a+bX1+cX2....* increases and the entire equation approach a ratio 1:1 or high probability. Conversely, as the value of *a+bX1+cX2...* Decreases, the exponent term in the denominator increases thereby reducing the overall ratio of the equation. As the exponent term increases more and more, the equation as a whole approaches zero.

3.4.2. Description of the Variables and Their Hypothesized Effect

Farmers to participate on soil and water conservation activities at any time are influenced by the combined effect of socio-economic, demographic and institutional factors. In this study farmers are asked whether they are actively participated in soil and water conservation practices or not in their land .The response fall in two categories. That is, 1=for households that actively involved in soil and water conservation practices and 0= for households that do not involve in soil and water conservation practices. Therefore, the dependent variables represent the extent of farmers participating on soil and water conservation practices.

The independent variables of the study are those variables which are hypothesized to influence farmers from actively participating on soil and water conservation measures. So, the potential explanatory variables selected in the study area include age, educational

level, farm experience, contact with extension agents, access to information, land renting, farm size, family size and distance from home.

The age of a farmer (**AGE**) can enhance or prevent the retention of conservation structure. With age, a farmer may get experience about his/her farm (Young and Shortle, 1984) and can react in favor of retention of structures. On the contrary, as evidenced by previous research results, older farmers are more likely to reject conservation practices (Gould et al, 1989). Thus, we expect "age" to have a positive or negative effect on the retention of conservation structures.

Exposure to education (**EDUCATION**) will increase the farmers' management capacity and reflect a better understanding of the benefits and constraints of soil conservation. Education also increases the ability to obtain and apply relevant information concerning the use of soil conservation practices. Education is thus hypothesized to increase the probability that a farmer will retain soil-conserving structures.

Contact with extension agents (**Contact_DA**), a proxy for access to information, is likely to contribute to farmers' conservation decisions. As indicated in innovation diffusion theory, a positive effect is expected of this variable.

Land renting (**rent_out**) influences the activities of soil conservation as studied done by Featherstone and Goodwin, 1993).that is farmers who rent the land not consider the conservation activities and thus it hypothesized that land renting is negative effect on soil conservation.

The effect of access to information (**access_info**) on soil conservation activities is hypothesized to be positive. Farmers who have access to information are thus expected to implement soil conservation structures than those without. That means, access to information increases the probability of retaining erosion controlling structures.

The effect of farm experience **(Farm experience)** on soil conservation also hypothesized positively. That is, farmers who have long experience on farm activities have a better understanding on erosion problem than farmers who have long experience. Hence farm experience hypothesized positively to implement soil conservation structures.

Large family (**family_size**) size may relax labor constraints needed for the construction and maintenance of conservation measures. Further, it may encourage investment in conservation practices due to the higher demand for more produce. The effect is therefore expected to be positive.

Distance of the farm plot **(Distance)** from homestead is expected to detract from investments in conservation due to increased transaction costs (Gebremedhin and Swinton, 2003). Thus, the closer the farm plot is to the farm dwelling area the closer supervision and attention it would get from the family (Bekele and Drake, 2003).

Farm size **(farm_size)** is expected to have a positive effect on perception of the soil erosion problem and conservation adoption for two reasons. first, farmers with smaller sized plots are likely to make less conservation effort than those with larger sized plots .Because the conservation structures take proportionally more space on smaller plots and the future economic benefits may be insufficient to offset the decline in production caused by the structures .Second ,larger farms may be expected to have greater levels and increased quality of management, which implies they are more likely to perceive the problem and take conservation action.

Table 2: summery of the variables used in the logistic regression model

Variables	Description of the variables	Expected relation ships
Dependent variables		
soil conservation practice	1=for households that actively involved in soil and water conservation practices and 0= otherwise	
Explanatory variables		
Educ	educational level of the household head	positive
Farm_experiance	Farm experience of the households in years	positive
family_size	Number of family members	positive
Contact_DA	Contacts with extension agents	positive
farm_size	The size of cultivated land in hectares	positive
access_info	access to information on soil conservation practice	positive
rent_out	Land renting out (crop sharing out)	negative
Age	Age of the household head in years	Positive/ negative
Distance	distance of farm land from homestead in kilometers	negative

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1. Demographic and Socio-economic Characteristics of Respondents

The sample households include small scale farmers whose life basically depends on the subsistence farming. Of the sample HHs, about 88 % of the heads of household are male. These household heads include a wide range of people: village elders, decision makers (local administration), younger people, older people, poor farmers and rich farmers. The general characteristics of the sampled households were presented in table 3.

Table 3: General Characteristics of the sampled households

Description	No.	Min.	Max.	Mean	Std. Deviation
Age of Household (years)	120	26	68	44.15	9.05
Family size	120	3	14	6.8	2.1
Farm experience in years	120	4	32	17.45	6.6

Source: own survey

Out of the total sample households in the study area, 12% of the household heads are women, who are single, widowed or divorced. All female household heads had their own land certificates. During discussion with women headed households they perceive land certificate helps to inherit their land to their children and helps to take compensations. But, they don't know the responsibility (obligation) which written on land certificate due

to limited access to information and also they rent (share out) their land due to labor shortage and no care for soil and water conservation practices on their land.

The average age of the sample household heads is 44 years with a standard deviation of 9.05 years. The average family size of the sample households is 6.5 persons with a standard deviation of 2.5. The family size of the sample households ranges from 3 to 12 persons (Table 3).

4.1.1. Age Status of Households and family members

Five age groups for head of household are identified and most of the household heads (38%) are in the age group between from 41-50 years (fig.4.1). The proportion of elderly farmers is 9%, an age group in which labor shortage can be a hindrance to practicing soil and water conservation measures. Moreover, these farmers usually rent out their land and soil and water conservation measures are not implemented.

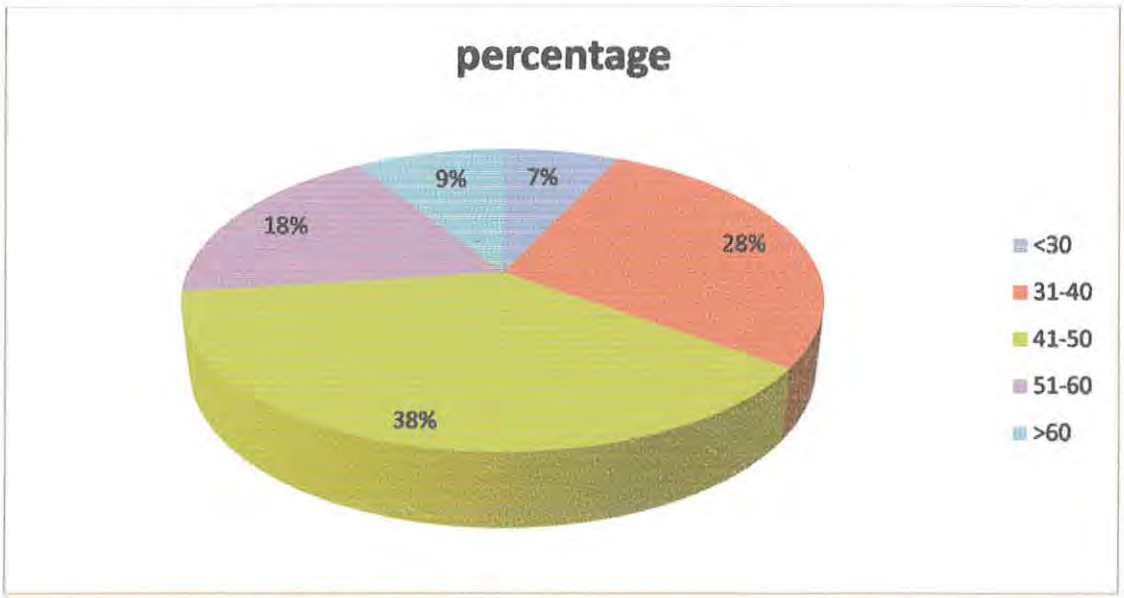

Fig 4.1: Age status of the households

Three age groups of family members were identified: 39% were less than 15 years old, 59% were between 15 and 60 years, and 2% older than 60 years.

The family size in the study area ranges from 3 to 14 persons with an average of 6.8 persons per household. If we consider family size focusing on economically active groups i.e. members whose age is between 15 and 60, on average there are about 2 economically active members per a family.

4.1.2. Marital status of the house holds

The marital status of the households in the study areas indicated in the (table 4) shows that majority of the households are married (90%), 3.3% of them are single , 5% are divorced and 1.7% of them are widowed.

Table 4: marital status of the respondents

Description	Frequency	Percent	Valid Percent	Cumulative Percent
married	108	90.0	90.0	90.0
single	4	3.3	3.3	93.3
divorced	6	5.0	5.0	98.3
widowed	2	1.7	1.7	100.0
Total	120	100.0	100.0	

Source: own survey

4.1.3. Education Status of Household

Five educational levels for household heads were identified, which include: "illiterate" (meaning no formal education), "read and write", "grade 1 - 4" , "grade 5-8", "grade 9 – 12 and above. From the survey result, about 75% of the household heads had no formal education (Table 5).

Most of the farmer household heads in the area are not educated (Table 5) and thus have little access to information about the purpose of land certificate and newly introduced soil and water conservation technologies.

Table 5: Educational status of household heads

Description	Frequency	Percent
illiterate	54	45.0
read and write	24	20.0
Grade 1-4th	20	16.7
Grade 5-8th	18	15.0
Grade 9- 12th	4	3.3
Total	120	100.0

Source: own survey

4.1.4. Off-Farm Economic Activities

In general, the relationship between off-farm employment and adoption of soil and water conservation is poorly understood (Kessler, 2006). Off-farm activities may have a negative effect on the adoption behavior due to reduced labor availability. When the farmer and family members are more involved in off-farm activities, the time spent on their farmland will be limited and hence the family is discouraged from being involved in construction and maintenance of SWC structures. On the other hand, off-farm activities can be a source of income and might encourage investment in farming and SWC.

The survey showed that 45.8% of the farmers are involved in various forms of off-farm activities. The major off-farm activity was collecting and selling of firewood. Other activities were petty trade, weaving, labor hired out and rent of their land in different ways.

4.1.5. Livestock Production

Livestock is an important component of the farming system in the study area. A vast majority of the sample households included in this survey own livestock of different kind. Cattle, donkeys, sheep, goats and chicken are common domestic animals. Sample farmers rear livestock for various purposes, including drought power, source of food, income and transporting of goods. The main sources of feed for livestock in the study area include straw, grazing land and crop residue. However, most farmers reported that currently the number of livestock decreasing due to the challenges in relation to lack of grazing land, lack of feed, lack of improved breeds, livestock disease, and poor management practice.

Table 6. Shows the number of livestock holds by HH

Description	N	Range	Minimum	Maximum	Mean	Std. Deviation
Oxen	119	11	1	12	2.94	1.422
Cows	118	2	1	3	1.42	.619
Heifers	95	2	1	3	1.29	.563
calf	103	3	1	4	1.23	.581
sheep	89	9	1	10	5.46	2.360
Goats	40	14	1	15	5.55	3.258
Horse	58	1	1	2	1.09	.283
Donkeys	112	3	1	4	1.69	.685
Hens	114	10	1	11	5.22	2.257
others	7	4	3	7	4.43	1.512

Source: own survey

4.1.6. Crop production

The major crops grown in Girar Jarso *woreda* include cereals, pulses and horticultural crops such as fruit, vegetables, root crops and beverages. Cereals include teff, wheat, barley, maize and sorghum whereas pulses include bean, peas, field pea, lentils and vetch. Besides, in a very small amount oilseeds such as linseeds and *nug* are growing. *teff*, wheat, barley and oats are important crops grown in *dega* and *woina dega* areas while sorghum, *teff* and maize are grown in *kolla* areas. Pulses such as bean, peas, field pea, vetch, and lentil are dominantly grown in *dega* and *woina dega* areas.

In the study area, problem of food insecurity is widely prevalent. Low crop productivity is among the reasons cited by sample farmers as being partly responsible for food insecurity. This in turn is caused by a number of factors and soil erosion being the major one. Although yield decline through time cannot be attributed to soil erosion problem alone, farmers felt it and repeatedly mentioned that soil fertility decline due to erosion has played a considerable role. From the sample households, 49% mentioned soil erosion as the underlying cause for productivity deterioration of their farmland. Fig. 4.2 shows the reasons for decline in production.

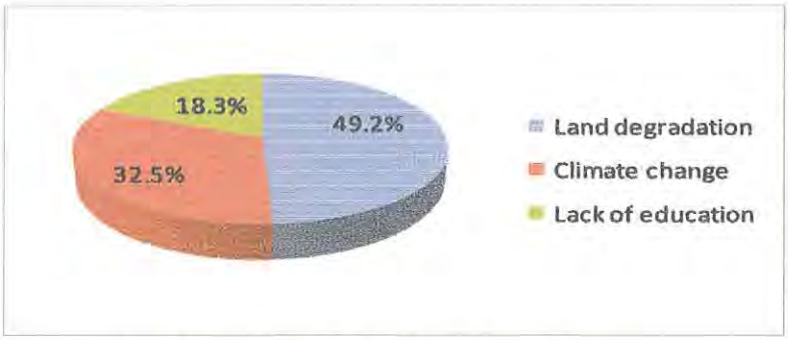

Figure.4.2 Major Constraints of crop production
Source: own survey

Farmers pointed out that the yield of their fields is declining from year to year. Farmers were asked to compare their current yield with that of ten years ago and 96.7% indicated that the yield for major crops is declining.

4.1.7. Land Characteristics

Land is one of the most important production factors for agricultural production. In rural households, in developing countries land and labor account for the largest share of agricultural inputs. Hence, the quality and quantity of land available for farm households largely determine the amount of production. In the study area, farmers have their own land and also renting of land highly undertaken by farmers in the study area.

Table 7 .Land holding size in the study area

		Land size in hectare			
No	**Land types**	minimum	maximum	mean	Std.Deviatioin
1	Cultivated land				
1.1	Rain fed	0.3	2	0.9	0.25
1.2	Irrigation	0.01	0.3	0.12	0.05
2	Grazing land	0.1	0.2	0.11	0.02
3	Forest land	0.05	0.5	0.2	0.08
	Total	0.46	3.0	1.33	0.4

Source: own survey

From the given table 7, it can be seen that the minimum and maximum land holding size of cultivated land is 0.3 and 2 hectare with the average of being of 0.25 hectare. Also, the minimum and maximum land holding size of grazing land is 0.1 and 0.2 hectare with the average of being of 0.02 hectare.

Respondents indicated that involvement in informal land exchange is common in the area. Sharecropping and renting of land are the two important exchange mechanisms prevalent. More than 80% of the respondents are involve in sharecropping-in/out arrangements. About 31% of the respondents involved in sharecropping-out arrangement while 56% involved in sharecropping-in arrangement. The main reasons for sharecropping-out include due to debit, lack of oxen and lack of labor. Whereas, the main reason cited by respondents for sharecropping-in was shortage of land. With regard to renting of land, we observed only few households who were involved in renting-out their land on a fixed cash basis. Also, the survey result shows that the agreement made during renting process does not match with what is written on the land use policy of the country. That is, almost all the agreement made while land renting (100%) is not known by responsible authority (institution) which is against land use policy. The duration of renting also extends from one year to a maximum of four years which depends on the agreement made between two parties. But majority of the farmers made land renting agreement for three years.

Almost, 100 % of the sample households perceived that their land is exposed to erosion and indicate soil erosion as a major problem they facing. There are different opinions of farmers about the reasons of erosions in the study areas. Majority of the farmers (82.4%) revealed that lack of well training on different soil and water conservation technologies is the main reason for the causes of erosion.

According to the discussion made with focus group discussions in each *kebeles*, the trend of erosion is increasing since 10 years due to various factors which are caused by human activities and low soil conservation practices to overcome the problem of soil erosion.

4.2.Land Registration and Certification

4.2.1. Process of land registration and certification

This section gives a short description about the distribution of land certificates. In the study area, out of the sampled HHs, 63 % have got land holding certificates in 2007, and the rest 37% before 2007.According to key informants there were some problems specially at the beginning of Land Registration and Certification .Among the problems are lack of awareness about the importance of land certificate by farmers, shortage of educated farmers to undertake land registration, shortage of land measuring materials and financial problems.

The respondents mentioned that their lands had been measured properly by those committees who have got enough training on land measurement. But there was some conflict during land demarcation especially with the neighbors whose plots are adjacent to each others. Such kind of conflict was solved by discussion with the elder members of the kebeles including the development agent. If the problem cannot be solved, the certificate is not issued. While asking about the right and responsibilities of farmers after getting certificates, most of them mentioned that certificate proves the legal ownership of land where-as regarding to their responsibilities which associated with conserving their land majority of the respondents some kind of awareness about their obligation due to the

fact that their level of awareness varies from farmers to farmers. That is, from the survey result, 73.3% of the farmers do not know the responsibilities and rights of farmers which are written on the land holding certificate.

4.2.2. Perceptions of farmers after getting certificates

Perception of the farmers about the certification programme plays an important role on their investments in land management and investment (Deininger *et al.,* 2009). Perception is generally difficult to predict as it is very subjective and not directly measurable matter. So here, perception is tried to see from different views and is categorized into inheritance of land, reduction of land disputes, getting credits for farm inputs, increase tenure security and investments in SLM, receiving compensation if land is taken away in the study areas.

Most farmers are quite confident that the certificates will help them to inherit their land to their children as they have a proof of their land ownership. About 98% of the farmers completely agree that they will inherit their land and 2% of them only disagree on this matter.

One of the problems associated with land conflict in the study area is border conflict. But after the distribution of these certificates, farmers are quite confident that nobody can claim their land and in case of some conflicts, the certificates can be used as a proof of their holdings. In the study area, 72% of the farmers completely agree that their land holding certificates will help to reduce border conflict with their neighbors and there is no any disagreement on this matter. The focus group discussion and interview with land

management committee also revealed that after getting land holding certificates, the border conflict has been solved especially for the redistributed land as the plot is demarcated in all four sides mentioning the total area of each plot.

Most farmers do not apply fertilizers, pesticides and other inputs to their field due to the financial problem in the study area. As most of the farmers are subsistence farmers and due to the financial problem, they are not capable to use these farm inputs. One of the benefits of having land holding certificates is that they can use certificates as collateral to the financial institute and can get credits to buy farm inputs (Deininger, 2003). The survey shows that majority of the farmers (82.5%) completely agree on getting credits by using land holding certificates as a collateral whereas 17.5% of them completely disagree on this matter.

Land tenure is the system of rights and institutions that governs access to and use of land and other resources (Maxwell and Weibe, 1998). Here attempt is made to know the how farmers perceive about tenure security after getting certificates. From the study shows, 80% farmers completely agree that the land holding certificates increase tenure security. This finding is similar to the finding of the study made by Holden and Tefera (2008) in Southern Ethiopia which showed that the land reform has contributed to increase perceptions of tenure security among small scale farmers.

According to focus group discussion, it was found that before getting land holding certificates, they had some kind of fear that their land will be taken away without any compensation if there is any need for urban expansion. Now the farmers are more confident that they will get compensation if their land is taken away as they have a proof

of holding certificates. The survey result shows that 76% of the farmers mentioned that they agree on this. Only few farmers do not think that they will get compensation as they believe that land still belongs to Government and it is difficult to say on the issue of Government. Megeleta Oromia, (2009) and Debub Negarit Gazeta, (2007) have also mentioned about the provision of giving compensation in case farmers are evicted from their land holding for public purpose.

There is a difference in perception of farmers about the security of the land before and after getting land certificates. Certificates provide them land titling and land rights and they can use their certificates as a proof of their land holding. While asking about the security of land before and after getting certificates, only 7.5% of the respondents mentioned that they were completely secure of their land before getting certificates but now 92.5% mentioned that they are completely secure due to certificates. It seems that there is a quite significant change in the perception of farmers before and after getting certificates. That is, almost all the respondents are completely secure about their land now after getting certificates. But during the focus group discussion in the study area, farmers mentioned that they will never be completely secure of their land just due to certificate as certificate is not a "Bible" or "Qur"an" and it can be changed anytime if there is change in Government. They are not sure about what will happen in the future as they already experienced a frequent land redistribution and change in Government with the change in land system in past in Ethiopia.

Perceptions about the current land holding system

Here it is attempted to know whether the farmers like the current land holding system or not and what kind of land holding system do they prefer. During focus group discussion, it is found that majority of the farmers mentioned that the current land holding system is good for them and only few of them mentioned as they do not know about such kind of issue. That is, about the land holding system, major prefer public ownership but secure rights and whereas some respondents prefer freehold or private ownership so that they can sell and mortgage their land. The belief of the respondents for preferring public ownership is that if the land is allowed to sell then at the time of emergencies, the land will be sold and afterwards they will be in a great problem as land is the only source of their livelihood.

4.3. Impact of Land Holding Certificates on Investments in Soil and Land Management

The previous discussion already shows the perception of the farmers. Now it is necessary to see whether this perception really has any role in making investments in SLM practices or there are some other factors which are affecting in making those investments. Here, it is tried to see the impact of land holding certificates by identifying different soil and water conservation practices that the farmers are practicing in the study area include agronomic practice such as crop rotation, intercropping double cropping, and construction of bunds such as soil and stone bunds, check dams and cut off drain construction and tree plantation .

The investments on SLM deals with the combination of the appropriate land use and management practices that promotes the productive and sustainable use of soils and, in the process, minimizes soil erosion and other forms of land degradation (Sanders, 2004). The investments on SLM are categorized as long term and short term investments according to the time duration those investments benefit farmers and land as well. Short term investments refer to investments in land for short term benefit usually for one to two year that include crop rotation, fallowing, construction of soil bunds, application of inorganic fertilizers and construction of traditional ditches whereas long term investments include construction of stone bunds, terraces, planting of perennial trees and application of organic manures whose benefit last for more than two years.

4.3.1. Tree plantation

As the survey result shows that tree plantation is highly influenced by land holding certificates. That is, as farmers mentioned 3% of them undertake tree plantation before land certificates where as 56% of the respondents undertake tree plantation after land holding certificates due to the sense of ownership increased by certificates. They perceive trees as to conserve soils and fulfill the demand of trees used for construction, fuel and economic purposes. Some studies also shows that certification and tenure security motivates in making long term SLM practices like tree plantation (Deiniger et al., 2009 and Palm, 2010).

Table 8.shows Tree plantation before and after land holding certificate through cross tabulation

Tree planting practice		After land holding certificate				Total	
		Yes		No			
		Count	% of Total	Count	% of Total	Count	% of Total
Before land holding certificate	Yes	4	3.3	0	.0	4	3.3
	No	63	52.5	53	44.2	116	96.7
Total		67	55.8	53	44.2	120	100.0

Source: own survey

4.3.2. Construction of Soil and stone bunds

Bunds are the physical structures which are constructed across the contour lines in order to reduce the impacts of soil erosions (Gebrernichael *et al.,* 2005). Soil and stone bunds are the dominant types of conservation structures in the study areas. Stone bunds are more durable than soil bunds. A combination of stone and soil bund has been found in some plots in the study areas.

From the survey result, it is found that only 3% of the respondents construct soil bunds before land holding certificates and majority of them (57 %) construct soil bunds which can be considered as the influence of certificates and also in the similar way stone bunds are constructed highly after land holding certificates than before holding certificates. The reason behind is not only due to certificate but also the diffusion of extension services on such types of soil and water conservation measures to reduce the impacts of soil erosion.

Table 9 .shows Construction of stone and soil bunds before and after land holding certificate through cross tabulation

		After land holding certificate				Total	
		Yes		No			
Construction of soil bunds		Count	% of Total	Count	% of Total	Count	% of Total
Before land holding certificate	Yes	4	3.3	0	.0	4	3.3
	No	64	53.3	52	43.3	116	96.7
Total		68	56.7	52	43.3	120	100.0
		After land holding certificate				Total	
		Yes		No			
Construction of stone bunds		Count	% of Total	Count	% of Total	Count	% of Total
Before land holding certificate	Yes	28	23.3	0	.0	28	23.3
	No	54	45.0	38	31.7	92	76.7
Total		82	68.3	38	31.7	120	100.0

Source: own survey

4.3.3. Construction of check dams

Check dams are obstruction walls applied to reduce the erosive capacities of run off by flattening out the steep uniform gradients of galleys into a serious of steps with low risers and long flat threads. They are commonly constructed from loose stone and /or brush wood. According to the survey result, only 27% of the farmers participate on check dam construction before land holding certificates; whereas majority of the respondents (67%) practice check dams on their land which are formed through gullies after certificates. Strong effort made by government on soil and water conservation practices contribute to check dam construction through mass mobilization communities which helps farmers to acquire knowledge on the purpose of check dam construction.

Table10. Construction of check dams before and after land holding certificate through cross tabulation

check dams construction		After land holding certificate			Total	
		Yes		No		
		Count	% of Total	Count	% of Total	Count	% of Total
Before land holding certificate	Yes	32	26.7	0	.0	32	26.7
	No	48	40.0	40	33.3	88	73.3
Total		80	66.7	40	33.3	120	100.0

Source: own survey

4.3.4. Construction of Cut Off Drains

Cut off drain is a channel excavated to intercept and collect run off from an unprotected upland area and to safely conduct to a water way; thus protect the land below from excessive erosion. The survey result shows that majority of the farmers (86%) practices cut off drains in the traditional way to prevent runoff water from their cultivated lands. This practice undertaken before and after land holding certificates which shows that there is no any relation with land certificate for constructing cutoff drains.

Table 11.shows Construction of cut off drains before and after land holding certificate through cross tabulation

Construction of cut off drains		After land use holding certificate				Total	
		Yes		No			
		Count	% of Total	Count	% of Total	Count	% of Total
Before land holding certificate	Yes	102	85.0	1	.8	103	85.8
	No	11	9.2	6	5.0	17	14.2
Total		113	94.2	7	5.8	120	100.0

Source: own survey

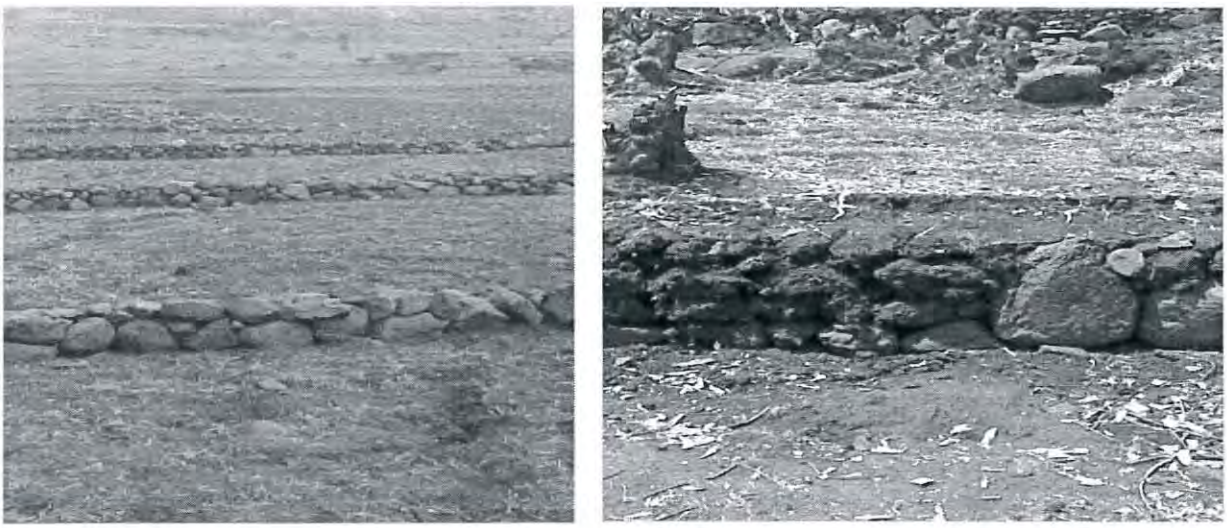

Figure 4.3 stone bund (left) and Soil bund (right)

4.4. Empirical Analysis of the Factors Influencing the Practice of Soil Conservation Practices

The maximum likelihood estimates for the binary logistic regression for the factors of soil and water conservation practices is presented in Table 12. The result of the model shows that some of the variables tested had the hypothesized sign and significantly affect the activities of soil conservation in the study area. From the total variables hypothesized which influencing soil and water conservation practices, three were found to be significant at 1% probability level. These include educational level of household heads, family size and land rent out (crop sharing). Also, one of the variables (farm experience) is significant at 5% probability level. Farm size and age was found to be significant at 10% probability level. The rest variables such as access to information, contact to development agent and distance of farm land from home were not found to be significant in the study areas.

Table 12. Parameter estimates of the binary logistic regression model

Variables in the Equation

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Educ	.710	.260	7.466	1	.006*	2.034
Farm_experiance	.588	.245	5.773	1	.016**	1.801
family_size	-.444	.165	7.235	1	.007*	.641
Contact_DA(1)	.588	.615	.914	1	.339	1.800
farm_size	-.528	.303	3.037	1	.081	.590
access_info	.268	.461	.339	1	.560	1.308
rent_out(1)	-2.156	.732	8.669	1	.003*	.116
Distance	.797	1.124	.502	1	.478	2.219
Age_cat			4.399	3	.221	
Age_cat(1)	4.812	3.974	1.466	1	.226	122.956
Age_cat(2)	3.227	2.760	1.367	1	.242	25.216
Age_cat(3)	2.824	1.681	2.823	1	.093	16.846
Constant	-2.595	5.202	.249	1	.618	.075

-2 Log likelihood 95.61; Cox & Snell R Square .436; Nagelkerke R Square .582; Chi-square 67.66; Overall Percentage 82.2

*=Significant at less than 1% level, ** = significant at 5% level.

Source: Model out put

As the binary logistic regression result shows, educational level of the household head **(educ)** was found to have significant positive effect on farmers for soil conservation practices. That is, the value of Exp (ß) for the variables of the education was 2.034 which imply an increase in the odds of 103.4%(2.034-1=1.034).This shows that for each unit increase in educational level ,survey respondents were 103.4% actively participate in soil and water conservation practices when compared to illiterate respondents. Hence, the degree of participating in soil and water conservation practice is highly influenced and directly proportional to educational level. According to Tegegne (1999) educated farmers tend to be better at recognizing the risks associated with soil erosion and exert more effort to conserve soil.

Land rented out **(rent-out)** was found to have significant negative effect on soil conservation practices. That is, according to model result shows the value of Exp (ß) for the variables of the survey respondents who rent out (share out) their land was 0.116 which imply a decrease in the odds of 88.4% (0.116-1= -0.884).This shows that farmers who rent out their land 88.4% less likely to participate actively in soil and water conservation practices compared to those who rent their land. This attribute to the fact that in most cases land renting contracts are of short term duration and this may not encourage farmers, who rent-in land to undertake conservation practices as conservation investment pay back only in the long term. Therefore, as the percentage of land a farmer rents- in increases, it is less likely that he/she will make an investment on conservation which was supported by the studies done by (Feather stone and Goodwin, 1993).

Farm experience **(farm_experiance)** was positively and significantly related to the dependent variables. That is, the value of Exp (ß) for the variables farm experience was 1.081 which implies an increase in the odds of 80.1% (1.081-1=0.801). This shows that farmers who have farm experience 80% more likely to participate actively in soil and water conservation practice when compared to those who have not experience on farm activities.

Family size **(family_size)** was negatively and significantly related to soil conservation activity which was contrary with the priori expectation. That is, the value of Exp (ß) for the variables of family size was -0.359 which imply a decrease in the odds of 35.9 %(0.641-1= -0.359). This shows that farmers who have large family size 35.9% less likely to participate in soil conservation practice which was supported by the studies done by

(Shiferaw and Holden, 1998). The possible explanation is that households with larger family size are likely to face food shortage in periods of droughts. As result, they try to maximize short- term benefits and would be less participated in soil conservation measures whose benefits can be reaped in the long run.

Contrary to our expectation, farm size **(farm_size)** was negatively related to the soil conservation practices and statistically significant at 10%. Garcia (2001) has also found similar results which say labor-intensive nature of constructing soil conservation structures.

As expected, access to information (**access_info**), contact with development agent **(Contact_DA)** and age **(Age_cat)** about soil conservation technologies seemed to be positively associated with participating on soil conservation practices. But its effect was not statistically significant. Moreover, the distance of the farm from home was not significantly affect farmers participating on soil conservation practices.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Land degradation is a main problem in Ethiopia. One of the major aggregate problems is the insecurity of land tenure among farmers (Gebreselassie, 2006). This study deals with the impacts of land holding certificates on soil conservation activities.

In the study area, majority of the farmers perceive the importance of land holding certificates in providing tenure security through different perspectives such as certificates helps to bequeath land to children, reduce land disputes, and increase tenure security and to receive compensation if the land is taken away. But, still there are farmers who do not know the importance of land holding certificates from different perspectives.

Even though farmers perceive the importance of tenure security after getting certificates, this positive perception is not always the reason to make SLM practices. Similar to the most of the studies done previously, which showed the mix result of the relation between land certificate and soil conservation practices, this study also shows two different results in the study areas. Erosion is considered as a problem in the study areas and farmers also undertake some SLM practices such as construction of soil and stone bunds, construction of check dams, cut off drains, tree plantation, practicing crop rotation and intercropping but these SLM practices are not always the consequences of land holding certificates which is in contrast of the study made by Palm (2010), Deininger *et al.* (2009) and Gebremedhin and Swinton (2003) in other parts of Ethiopia.

On the other hand, there are some soil conservation practices which seemed to be more influenced by land holding certificates. Most respondents revealed that having certificates motivated them in making soil conservation practices like soil bund, stone bund, check dam, cut off drain construction and plantation of different multipurpose trees on gully areas. Few respondents mentioned that the constructions of these soil conservation practices are not only due to certificates but also strong extension services and mobilization of the community by the government.

Also, based on the analysis made on some selected variables which influence soil and water conservation it was found from the analysis that educational level, farm experience, family size and land renting have a significant impact on farmer's soil conservation practices. Educational level of household and farm experience influences soil and water conservation practice positively where as land renting and age influences soil and water conservation practice negatively. There was also knowledge gap between farmers on land policy issues such as the rights and obligation on land use or soil conservation activities.

Off-farm employment is an important means that supplement the low level of farmers' income. In this study we found a negative relationship between access to off-farm employment and participating in soil conservation practice.

5.2 **Recommendations**

Based on the findings of the study the following issues are forwarded as recommendation to show the gab in relation to knowledge on the impacts of land holding certificates and the factors influencing soil conservation activities in Girar Jarso *woreda.*

- The impacts of land holding certificates from different perspectives particularly the way farmers get credit through their land holding certificates should be highly considered so as to reduce labor competition from soil and water conservation practices.
- The role of land holding certificates on soil conservation practice is so high particularly by increasing farmer's confidence in security to invest on their land. However, only very few farmers were aware of their obligations and the rights as stated on the land holding certificates. Hence, through various workshops and training, the land use administration and protection office at woreda level should exert maximum effort to raise farmers' awareness on land certification program especially in relation to rights and obligation on their land.
- The influence of educational level and farm experience on swc practices is so high that these points should be more focused in the study area.
- The influence of land renting on swc practice has not got emphasis that considering this point in line with creating awareness on land renting process and implementing land policy on the ground may greatly contribute to increase the sustainable use and widespread of soil conservation structures.

- The effect of access to information influence the practice of soil conservation which implies it need attention has to given on this point.
- The impacts of off- farm employment on soil conservation practices also one of the important points which should considered in order to alleviate the labor competition for satisfying consumption requirements.

To sum up, given the significance of agriculture in Ethiopia, the problem of soil erosion has to be given due emphasis and taken seriously and genuinely. To this end, it is important to give adequate consideration of those points discussed above. The aspects emphasized and the recommendations forwarded could contribute substantially towards the sustainability of soil conservation measures.

References

Amsalu Akililu. and Graaff, J.(2007). Determinants of adoption and continued use of Stone terraces for soil and water conservation in an Ethiopian highland Watershed. *Ecological Economics* 61, 294-302.

Antle, J.M., Stooevogel, J.J. and Valdivia, R.O.(2006). Multiple Equilibria, Soil conservation Investments and The resilience of Agricultural Systems. *Environment and Development Economics*, 11(4), 477-492.

Bekele Wagayehu., Drake, L. (2003). Soil and water conservation decision behavior of subsistence farmers in the Eastern Highlands of Ethiopia: a case study of the Hunde-Lafto area. Ecol. Econ. 46 (3), 437–451.

Bewket Woldeamlak, Sterk, G.(2002). Farmers' participation in soil and water conservation activities in Chemoga watershed, Blue Nile Basin, Ethiopia. Land Degradation Development. 13, 189–200

Brasselle (2002). "Land tenure security and investment incentives: Puzzling evidence from Burkina Faso." *Journal of Development Economics*, 67 (2): 373–418.

Berry L. (2003). Land degradation in Ethiopia: its extent and impact.

Deininger , K. and Jin, S. (2006) . "Tenure Security and Land-related Investment: Evidence from Ethiopia." *European Economic Review* 50, 1245-1277.

Deininger, K., Ayalew Ali, D., Holden, S. and Zevenbergen, J.(2008). Rural land certification in Ethiopia: Process, initial impact, and implications for other African countries. *World Development*, 36(10), 1786–1812.

Deininger, K., Ayalew Ali (2009). Impacts of Land Certification on Tenure Security, Investment and Land Markets: Evidence from Ethiopia. *Environment for Development*, Discussion Paper Series, 1-36.

Deininger, K. (2003). Land Policies for growth and poverty reduction. A World Bank Policy Research Report.

Dessalegn Rahmato (2003). 'Resettlement in Ethiopia: The tragedy of population relocation in the 1980s', *FSS Discussion Paper* No 11, Addis Ababa: Forum for Social Studies

EEPRI (2002). A Research Report on Land Tenure and Agricultural Development in Ethiopia.

FAO Corporate Document repository, Land Tenure and Rural Development, Rome (2002).

Featherstone AM, Goodwin BK. (1993). Factors influencing a farmer's decision to invest in long- term conservation improvements. Land Economics 69: 67–81.

Federal Rural Land Administration Proclamation NO. 89/1997.

Feder, G. and Nishio, A. (1998). "The benefits of land registration and titling: Economic and social perspectives", Land Use Policy, 15 (1):25-43.

Feder, G., and A. Nishio (1999). The benefits of land registration and titling: Economic and social perspectives. *Land Use Policy* 15: 25-43.

Garson (2011): *Logistic regression; Topics in multivariate analysis*. Retrieved December 14, 2011, from NC State University: Quantitative research in public administration:viewed from http://faculty.chass.ncsu.edu/garson/PA765/logistic.htm on 21/11/2011

Gebremedhin Berhanu and Swinton (2003). Investment in soil conservation in northern Ethiopia: the role of land tenure security and public programs. *Agricultural Economics,* 29, 69–84.

Gebrernichael, D. (2005). Effectiveness of stone bunds in controlling soil erosion on cropland in the Tigray Highlands, northern Ethiopia. *Soil Use and Management* 21, 287-297

Gebreselassie Samuel (2006). Land, land Policy and smallholder Agriculture in Ethiopia: Options and Scenario. Paper prepared for the Future Agriculture Consortium meeting at the Institute of development Studies.

Ghebru Hosaena. And Holden,S. (2008). Land Certification in Ethiopia: An Illusion or a Solution?

Girma Taddese (2001). Land degradation: A challenge to Ethiopia."" Environmental Management 27(6): 815–824.

Gizachew Abegaz and Solomon Bekure (2009) .Rural Land Transactions and Agricultural Investment Proceedings of a Consultative Meeting Adama

Goeschl, T. and Igliori.(2006). Property Rights for Biodiversity Conservation and Development: Extractive Reserves in the Brazilian Amazon. *Development and Change,* Vol. 37, No. 2, 427 – 51.

Gould et al (1989). Conservation tillage: The role of farm and operator characteristics and the perception of soil erosion. *Land Economics* 65(2): 167-82

Greenland, D.J., Bowen, G., Rhoades, R., and Valentin, C. (1994). Soil, water, and nutrient management research - a new agenda. IBSRAM Position Paper, International Board for Soil Research and Management (IBSRAM), Bangkok, Thailand.

Gudeta Seifu, Rural Land Tenure Security in the Oromia National Regional State, In Muradu Abdo Eds., Land Law and Policy in Ethiopia since 1991: Continuities and Changes, *Ethiopian Business Law Series,* Vol.III (2010)

Hagos Fitsum. and Holden, S.(2006). Tenure security, resource poverty, public programs, and household plot-level conservation investments in the highlands of northern Ethiopia. *Agricultural Economics* 34, 183–196.

Hoben, A.(1995). Paradigms and Politics: The Cultural Construction of Environmental Policy in Ethiopia. *World Development,* 23(6), 1007-1021.

Holden, S. and Tefera Tewodros (2008) Land Certifcation in Ethiopia. Early Impacts on Women. United Nations Human Settlements Programme (UN-HABITAT).

Holden, S.T. and Yohannes Hailu (2002). Land Redistribution, Tenure Insecurity, and Intensity of Production: A Study of Farm Households in Southern Ethiopia. *Land Economics*, 78(4), 573-590. 57

Holden, S. T., Deininger, K., and Ghebru, H.H. (2009). Impacts of Low-Cost Land Certification on Investment and Productivity. *Agricultural Economics*, 91, (2), 359-373.

Hurni H. (1988). Degradation and conservation of the resources in the Ethiopian highlands. *Mountain Research and Development* 8(2/3):123–130.

Jansen, K. and Roquas, E. (1998). Modernizing Insecurity: The Land Titling Project in Honduras. *Development and Change,* Vol. 29, No. 1, 81–106.

Kabubo-Mariara, J. (2007). Land conservation and tenure security in Kenya: Boserup"s hypothesis revisited. School of Economics, University of Nairobi, Kenya.

Kanji, N., Cotula, L., Hilhorst, T., Toulmin, C. and Witten, W. (2005). Can Land Registration Serve Poor and Marginalized Groups? Research Report 1.

Keeley, J., and Scoones, I. (2000). Knowledge, power and politics: the environmental Policy making process in Ethiopia Journal of Morden African Studies 38:89-120.

Kessler, CA (2006) Decisive key factors influencing farm households' soil and water conservation investments. Applied Geography 26:40–60.

Mohamed Ahmed (2002). Evolution and technical efficiency of land tenure systems in Ethiopia. Socio- economic and Policy Research Working Paper 39.

Maxwell, D. and Wiebe, K. (1999). Land Tenure and Food Security: Exploring Dynamic Linkages. *Development and Change,* Vol. 30, No. 4, 825–844.

Migot-Adholla, S., Hazell,P., Blarel,B. and Place,F.(1991). *Indigenous Land Rights Systems in Sub-Saharan Africa: A Constraint on Productivity?* The World Bank Economic Review, 5(1), 55-175.

Neef, A. (2001). Land Tenure and Soil Conservation Practices- Evidence from West Africa and SouthEastAsia.Viewedfrom:http://www.tucson.ars.ag.gov/isco/isco10/Sustaining the Global Farm/P238-Neef.pdf on 21/11/2011

Negatu Workneh (2005). Land Tenure and Technological Improvement in Smallholder Agriculture of Ethiopia. Paper prepared for presentation at conference on „Land and the challenge of sustainable development: a public dialog, co-hosted by Forum of for Social Studies (FSS), the Ethiopian Economic Association (EEA) and the Agricultural Economics Society of Ethiopia (AESE), Addis Ababa.

Nzioki, A. (2006). Land policies in sub-sharan Africa.clear, Resource center for rural development. Center for land, Economy and rights of wome.Nirobi, Kenya.

Oromia Rural Land Use and Administration Proclamation No. 130 /2007.

Placea, F. (2009). Land Tenure and Agricultural Productivity in Africa: A Comparative Analysis of the Economics Literature and Recent Policy Strategies and Reforms. *World Development*, 37(8), 1326-1336.

Roth, M., Haase, D. (1998). Land Tenure Security and Agricultural Performance in Southern Africa. BASIS-CRSP Program, Land Tenure Center, Madison.

Sabita Giri (2010).The Effect of Rural Land Registration and Certification Programme on Farmers' Investments in Soil Conservation and Land Management in the Central Rift Valley of Ethiopia

Sanders, D. (2004). Land Use, Land Cover and Soil Sciences- Soil conservation. Viewed from http://www.eolss.net on 23/11/2011.

Shiferaw S, Holden ST. (1998). Resource degradation and adoption of land conserving technologies in the Ethiopian highlands: a case study in Andit Tid, North Shewa. Agricultural Economics 18: 233–247.

Tadesse Million and Belay Kassa (2004). Factors Influencing Adoption of Soil Conservation Measures in Southern Ethiopia: The case of Gununno area. Agric. and Rural Develop. 105: 49-62.

Tegegne Gebre-Egziabher (1999). Willingness to pay for environmental protection:an application of contingent valuation method (CVM) in Sekota District, Northern Ethiopia.Ethiopian Journal of Agricultural Economics 3: 123–130.

Tenaw Shimelles., Islam, K.M.Z. and Parviainen, T. (2009). Effects of land tenure and property rights on agricultural productivity in Ethiopia, Namibia and Bangladesh. Discussion Papers no 33. Department of Economics and Management, University of Helsinki, Helsinki.

Teshome Admassa (2006). Agriculture, Growth and Poverty Reduction in Ethiopia: Policy Processes around the New PRSP (PASDEP). A paper for the Future Agricultures Consortium workshop, Institute of Development Studies, March 2006.

Todaro, M. and Smith, S. (2003) *Development Economics,* Pearson Education Limited, London.

USAID (2000). Amhara National Regional State food security research assessment report.

USAID (United states Agency for international development), 2007. Land Tenure and Property Rights Framework.

Yigremew Adal, Review of Landholding Systems and Policies in Ethiopia under the Different Regimes,Addis Ababa,Ethiopian Economic Association/Ethiopian Economic Policy Research Institute (2002)

Young, C. E., Shortle. J. S. (1984). Investments in soil conservation structures: The role of operator and operation characteristics. *Agricultural Economics Research* 36 (2): 10-5

Zikhali, P. (2008). Fast Track Land Reform, Tenure Security and Investments in Zimbabwe. Environmental Economics Unit .Göteborg University, Sweden.

APPENDEX I: Household heads questionnaire

1. Respondent Code number..... 2. Kebele.....

A. Household characteristics

1. Name of House hold head
2. Sex 1) male 2) Female
3. Age.....in years
4. Religion 1) Orthodox 2) Muslim 3)Others
5. Marital status 1) married 2) single 3) divorced 4) widowed
6. Social status 1) religious leader 2) political leader 3) political member 4) others
7. Level of education of household heads 1) illiterate 2) read and write 3) Grade 1-4th

   4) Grade 5-8th 5) Grade 9- 12th 6) above grade 12

8. Farm experience of the household heads in years .....
9. Household family size with age and sex

Family members	sex		total
	male	female	
Children < or =10 years			
Between 11-14 years			
Adult 15-60 years			
More than 60 years			

B. Livestock production

10. Do you participate in animal husbandry? 1) yes 2) No

11. If yes for Q no (10) fill the following table.

Animal type	**total number**
Oxen	
Cows	
Heifers	
Mules	
Horses	
Donkeys	
Goats	
Sheep	
Others specify	

12. How is the present number of animal as compared to the previous years?

1) Increasing 2) decreasing 3) remain the same

13. What is /are the main source of feed for your animals? A) grazing b) hay c) crop residue d) others

14. Is there feed shortage for your animals? 1) Yes 2) no

15. What are the major livestock constraints in your area? Fill the table and rank it.

Livestock production constraints	**Rank**
Repeated drought	
Animal Disease	
Feed shortage	
Lack of improved feeds	
Others	

C. Crop production

16. Fill the table below

Types of crop produced	Yield in quintals		Remarks
	2011	2012	
Teff			
Barley			
Wheat			
Sorghum			
Maize			
Millet			
Oats			
Bean			
Hair coats beans			
Chickpeas			
Lentils			
Niger seed			
Lin seed			
Others			
Total			

17. How is the present yield as compared to the previous years?

1) Increasing 2) decreasing 3) remain the same

18. If decreasing for Q (17), what measures do you take to boost up your production? 1) Using swc measures 2) using compost 3) using inorganic fertilizer 4) Agronomic practice like Crop rotation 5) others

19. How do you perceive the fertility of your farm land for crop production?

1) Very fertile 2) fertile 3) less fertile

20. What is the major constraint of crop production in your area? Fill the table and rank it.

Crop production constraints	**Rank**
Repeated drought/climate change	
Plant Disease	
Shortage of improved seeds	
Land degradation	
Lack of education	
Others	

21. Are you participating in of farm activities? A) Yes b) No

22. If yes for Q (22), what are the activities you are engaged on? .....

23. What is the distance of farm land from home? 1) A) 0.2-1km B) 1.1-2km

C) 2.1-4km D) 4.1-5 km E) >5

D. Land use and size

24. Do you have your own agricultural land? 1) Yes 2) no

25. If yes for Q (21), fill the table below.

No.	Types of land use	Size		Remarks
		Timad	hectares	
1	Cultivated land Rain fed			
	irrigation			
2	Grazing land			
3	Forest land			
4	Others			
5	Total			

E .Land holding certificate and management

26. Did you already have your land holding certificates? 1) Yes 2) No

27. If you have land holding certificates, when did you get that? A) Before one year B) Before two years C) before three years D) Before four years E) Before five years and above

28) How is the land holding certificate issued?

A. By the name of the husband b. By the name of the wife c. jointly by husband and wife

29) Who is handling the certificate? 1) Husband 2) Wife 3) Both

30) Do you know responsibilities and rights of farmers which are written on the land holding certificate? 1) Yes 2) No

31. If No for Q (27), what is the reason behind? a) Lack of training b) poor extension system c) others

32. Do you rent in the land? 1) Yes 2) No

33. If yes for Q (29), what is /are the reason /s for rented in /shared in?

1) Extra labor that I have 2) land shortage 3) extra input that I have 4) others, specify.....

34. For how many years long you rent in land? A) one year B) two years) c) three years D) four years E) five years and above

35. Do you have responsible to protect, maintain and use some structures /resources already established on the land you rented in? 1) Yes 2) No

36. If yes for Q (32), who covers the extra labor cost of conservation activities undertaken on the land? A) The owner of the land B) the contractors (farmers who rent in) C) Both

37. What other mechanism do you use to increase soil fertility in order to raise the yield production on rented land? a) Organic fertilizer like compost b) Inorganic fertilizer C) Others

38. Do you rent out the land? 1) Yes 2) No

39. If yes for Q (35), what is /are the reason /s for rented out /shared out?

1) Shortage of seed /fertilizer 2) shortage of oxen 3) shortage of labor 4) due to debit 5) others

40. For how many years long you rent out land? A) one year B) two years) c) three years D) four years E) five years and above

41. Do you follow up your land rent out in case if it is going to be damaged by soil erosion? 1) Yes 2) No

42. When rented in /out your land, what is the type of agreement? 1) In birr 2) in years 3) in production 4) others specify.....

43. If the land you rented out is damaged by soil erosion, what action do you take? A) Enforce the renter in order to take maintenance B) Stop the agreement C) Others specify.....

44. During your agreement, does the government body know your agreement? 1) Yes 2) No

45. Regarding to SWC activities undertaken in your land before and after land use certificate fill the table below.

No.	Types of soil Conservation Measures undertaken	Before land holding certificate		After land holding certificate		Remark
		yes	No	yes	No	
I	Agronomic practice					
1	Crop Rotation					
2	Intercropping					
3	Double cropping					
4	Grass strips					
II	Biological measure					
1	Plantation on bunds by Vitivar grass,sessbina sessban and others					
2	plantation on gullies with multipurpose trees					
3	Agro forestry practice					
III	Physical Measure					
	Soil bund					
	Stone bund					
	Check dams					
	Cut –off drain					
	Water way					
	Others					

F. Perception of farmers towards land holding certificate

46. Fill the table below

S.N	Farmers perception's on Land Certificate	Yes	No	Remarks
1	Helps to inherit my land to my children			
2	Reduces border conflict			
3	Helps in getting credits for farm inputs			
4	Increase tenure security			
5	Increase investment in land management			
6	Receive compensation if the land is taken away			

47. How you feel about the security of your land now after getting land holding certificates?

1) Completely insecure 2) Slightly insecure 3) Slightly secure 4) Secure 5) Completely secure

48) How you feel about your land security before getting land holding certificates?

1) Completely insecure 2) Slightly insecure 3) Slightly secure 4) Secure 5) Completely secure

49) Do you think that the current land holding system is good for you?

1) Yes 2) No 3) Do not know 4) No response

G. Source of information regarding to soil conservation measures

50. From where do you get technical advice and information concerning swc technologies? 1) DA 2) fellow farmers 3) woreda swc experts 4) NGOs 5) others

51. What kind of support / information do you get from these bodies?

1) Training 2) Field visit 3) demonstration 4) others, specify

52. Do you have a good contact with DA? 1) Yes 2) No

53. If yes for Q (49), how many days does the DA visit you per month? A) Once the time B) two times C) three times D) four times and above

54. Do you participate in extension package program that includes swc measures? 1) Yes 2) No

55. Have you get any training concerning swc techniques and technologies? 1) Yes 2) No

56. If yes for Q (52), who gave the training? 1) woreda agricultural office 2) NGOs 3) DAs 4) others, specify

57. Is the training sufficient to improve your skill and knowledge? 1) Yes 2) No

58. If yes for Q (54), do you apply the knowledge you acquired from the training? 1) Yes 2) No

59. What are the main causes of soil erosion in your opinion and rank them .use the table below

Causes of soil erosion	Rank
Overgrazing	
Plowing steep slops	
High rainfall	
Limited use of swc measures	
Damaged conservation structures	
Continuous cultivation	
others specify	

60. What are the general problems encountered in sustaining swc technologies? use the table below.

Problems	Rank
Extension education is not widely diffused	
Swc technologies are labor ,land capital intensive	
Lack of awareness about soil erosion problems and importance of swc technologies	
Shortage of land	
Problem of land tenure security	

APPENDIX. II: Checklist for Key Informant Interview

For development agents, SWC experts as well as agro-forestry experts

1. Name.....
2. Education status.....
3. How long are you stayed in this position?
4. How do you perceive about the following in your woreda in general and the study area in particular? A) The major forms/types of soil erosion B) the major causes of soil erosion C) the extent and severity of soil erosion D) the perception level of farmers towards soil erosion E) the response of farmers towards soil erosion problems in the study area.
5. Are there any swc packages in your woreda?
6. If yes, what major strengths and weakness does it has?
7. Which kind of swc measures do you think that the most acceptable and widely disseminated by farmers? Why?
8. When is begin giving land holding certificate to farmers in the area?
9. What major problems do you encountered in the application of land use certification in the study area?
10. In the woreda, how much farmers have got land holding certificate before three years and up to now?
11. What efforts being done by your office with regard to giving awareness to farmers on land holding certificate?

12. What opinion do you have with regard to the effectiveness/impacts of land holding certificate on swc measures?
13. What do you observe regarding to swc practices undertaken before and after land holding certificate in the study area?
14. What do you think about the perception level of farmers towards land holding certificate?
15. Do you think that farmers having land holding certificate know their responsibilities and rights which is written on the land holding certificate in the study area? If no, what is the problem?
16. What major problems do you encountered in the application of land holding certificate in the study area?
17. What comments do you have on the planning, designing, implementation and evaluation of swc works in your woreda as well as the study area?
18. What general opinion do you have regarding the sustainability of swc works in your woreda?

APPENDIX III. Checklists for focus group discussion

For farmers

1. Discuss the soil erosion problems in your farm land.
2. What kind of SWC measures undertaken on your to prevent the problem of soil erosion problem?

3. What benefit do you get from land holding certificate?
4. What do you say on current land holding system and security of your land?
5. Do you get adequate support from agricultural experts such as DAs regarding to the issue of land use certificate?
6. What limitation /problems do you face on land holding certificate during the implementation of the program?
7. What general opinion do you have for the sustainability of swc measures in your farm plots?

Glossary

Belg	Small rainy season mostly from February to April
Dega	Agro-climatic zone that lies between 2400 and 3300 meter above sea level.
Holding certificate	Certificate of title issued by Oromia Bureau of Agriculture and Rural Development as proof of rural land use right.
Kebele	It is the smallest administrative unit in Ethiopia.
Kolla	Agro-climatic zone that lies between 500 and 1500 meter above sea level.
Meher	Long rainy season based on summer rainfall
Timad	An area which covers an estimate of 0.25 hectars.
Woinadega	Agro-climatic zone that lies between 1500 and 2400 meter above sea level.
Woreda	Lower administrative unit in Ethiopia that is above the kebele and below zone.