ADDIS ABABA UNIVERSITY

COLLEGE OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

ASSESSMENT OF LAND MANAGEMENT PRACTICES IN GIRAR JARSO WOREDA, CENTRAL ETHIOPIA

BY
MOTUMA DAME



A THESIS PRESENTED TO ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

IN PARTIAL FULFILLMENTS OF THE REQUIREMENTS
FORTHEDEGREE OF MASTER OF ARTS IN GEOGRAPHY AND ENVIRONMENTAL STUDIES

FEBRUARY, 2017

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLEGE OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHYAND ENVIRONMENTAL STUDIES

ASSESSMENT OF LAND MANAGEMENT PRACTICES IN GIRAR JARSO WOREDA, CENTRAL ETHIOPIA

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ART IN LAND RESOURCE MANAGEMENT

BY

MOTUMA DAME

ADVISOR

Prof. MOHAMMED ASSEN

FEBRUARY, 2017

ADDIS ABABA UNIVERSITY

COLLEGE OF SOCIAL SCIENCES AND HUMANITIES

This is to certify that the thesis prepared by Motuma Deme entitled: Assessment of Land Management Practices in Girar Jarso Woreda, Central Ethiopia is submitted in partial fulfillment of the requirements for the Degree of Master of Arts in Geography and Environmental Studies with specialization of Land Resources Management with the regulation of the university and meets the accepted standards with respect to originality and quality.

Signed by Examining committee:

Tebarek Lika	(PhD) _____	_____	
Chairperson		Signature	Date
Asmamaw Legass	(PhD)_____	_____	
External examiner		Signature	Date
Dessalegn Yayeh	(PhD)_____	_____	
Internal examiner		Signature	Date
Prof. Mohammed Assen	_____	_____	
Advisor		Signature	Date

Declaration

I, certify that this thesis is my original work and has not been presented for a degree in any other university and that all sources of material used for this thesis have been dully acknowledged.

Motuma Deme Senbetu

School of Graduate Studies

May, 2016.

This thesis has been submitted for examination with my approval as university advisor.

Prof. Mohammed Assen_____

Acknowledgements

I would like to express my profound and sincere thanks to Prof. Mohammed Assen my Thesis Advisor, for his invaluable comments, constructive criticism and expert guidance throughout the study. My sincere thanks go to Girar Jarso Woreda Agricultural and Natural Resources Office staff for giving me relevant data. I would like to extend my appreciation for all interviewed farmers for giving me time. I am also highly indebted to Fiche Town Administrative and Abdisa Aga Secondary School for material and moral support. I am most deeply grateful to Ato Ketema Regassa and Ato Chala Cheru for helping me strive towards the realization of my potentials, initiation, encouragement and moral support. Finally, I would like to express my gratitude to friends who were directly or indirectly involved to add their efforts, encouragement and moral support for the accomplishment of this study

Table of Contents

Contents **Pages**

Acknowledgements i
Table of Contents ii
List of Tables v
Lists of figures vi
List of Appendices vii
Acronyms viii
Abstract ix
CHAPTER 1: INTRODUCTION 1
1.1. Background of the Study 1
1.2. Statement of the problem 3
1.3. Objectives 4
1.4. Research Questions 5
1.5. Significance of the Study 5
1.6. Scope and limitation of the study 5
1.7. Organization of the Thesis 6
CHAPTER 2: REVIEW OF RELATED LITERATURE 7
2.1. Concepts of Land management Practices 7
2.1.1. Land Management Practices in the World 7
2.1.2. Land management practices in Africa 9
2.1.3. Land management practices in Ethiopia 9
2.1.3.1. Indigenous land management practices 10
2.1.3.2. Introduced land management practices 10
2.2. Determinants of Land Management 11
2.2.1. Natural factors 12
2.2.1.1. Farm size 12
2.2.1.2. Slope of the land 13
2.2.1.3. Climate 13

2.2.2. Socio-economic and Institutional Factors 14
2.2.2.1. Population Pressure 14
2.2.2.2. Poverty 15
2.2.2.3. Land Tenure 16
2.2.2.4. Policy/Institutional Support Related Factors 17
2.2.3. Socio-cultural factors 18
2.3. Conceptual Framework 19
CHAPTER 3: RESEARCH METHODS AND METHODOLOGY 21
3.1. Description of the study area 21
3.1.1. Location 21
3.1.2. Topography, Climate and Soil 21
3.1.3. Population, land use and agriculture 24
3.2 Research Design 25
3.3. Sources of Data 26
3.4 .Sample population and Sampling Techniques 26
3.5. Data Collection tools 27
3.5.1 Questionnaire 27
3.5.2. Interview 28
3.5.3. Focus group discussions 28
3.5.4. Key Informant Interview 28
3.5.5. Observations 28
3.6. Method of Data Analysis 29
CHAPTER 4: RESULTS AND DISCUSSIONS 30
4. 1.Background Characteristics of the Respondents 30
4.2. Demographic characteristics 30
4.2.1. Age of the Respondents 30
4.2.2. Sex of the Respondents 31
4.2.3. Respondent Marital Status 31
4.2.4. Family Size 32
4.3. Socio- Economic Characteristics 32
4.3.1. Educational Status 32

4.3.2. Livestock Ownership 33
4.3.3. Land ownership 35
4.3.4. Land holding size.....35
4.3.5. The Nature of Landform 36
4.4. Land Management Practices in the Study Area.....38
4.4.1. Indigenous land management practices 39
4.4.2. Introduced land management practices.....40
4.5. Determinants of land management Practices.....42
4.6. Dominant of Land Management Practices 43
4.7. Problem of Land Management Practices.....44
4.8. Awareness of Modern Land Management Practices.....44
4.9. Agricultural input used.....45
4.10. Access to agricultural extension services 46
CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS.....48
5.1. Summary.....48
5.2. Conclusion 50
5.3. Recommendation.....51
REFERENCE.....52
Appendices

List of Tables

Pages

Table 3.1. Land use pattern of Girar Jarso woreda , 2015 24

Table3.2. Livestock's population of Girar Jarso woreda 25

Table 3.3: Sample Size Distribution 27

Table 4.1 Percentage distribution age of the respondents 30

Table 4.2 Percentage distribution of the sex of respondents 31

Table 4.3.The Marital Status of the Household Respondents 31

Table 4.4. Household size distribution 32

Table 4.5. Percentage Distribution of Literacy Status of the Household Respondents 33

Table 4.6.Number of Livestock of the Respondents 34

Table 4.7.Land Owning percentage of Respondents 35

Table 4.8. Respondent Land Size in Hectares 36

Table 4.9. Percentage Distribution of Respondent on the nature of land form in their area 37

Table 4.10: Households Response on Land Management Practice 38

Table 4.11.Percentage of Determinant factors of Land Management practiced in the study area. 43

Table 4.12. Percentage of Dominant Practices of Land Management in the study area ... 43

Table 4.13. Percentage distribution of Problem of Land Management Practices 44

Table 4.16. Percentage distribution of Respondents on awareness of Modern Land Management Practices applied in the study area 45

Table 4. 16. Percentage distribution of respondents about access to agricultural extension services 46

Table 4.15. Percentage of respondents on kinds of agricultural practice and input used on farm plot 46

Lists of figures

Pages

Figure 2.1. Conceptual frame work of the study.....20

Figure 3.1. Location Map of the Study Area 21

Figure 3.2. Mean monthly min and Mean monthly max Temperature (c^o) for Girar Jarso Woreda(2004-2014).....22

Figure 3.3.Annual Rain Fall values (mm) for Girar Jarso Woreda(2004-2014).....23

Figure 4.1. Sloppy area used for cultivation in Girar Geber.....37

Figure 4.3. Check Dam in Ellamu sub watershade 41

Figure 4.2. Field with stone/ soil bund in Ellamu kebele 40

List of Appendices

Annex I. Household Survey Questionnaires

Annex II. Key Informant Interview

Annex III. Checklist for Focus Group Discussion

Annex IV. Observation

Acronyms

CSA	Central Statistical Authority
DAs	Development Agents
EEA/EEPRI	Ethiopia Economic Association/Ethiopia Economic Policy and Research Institute
EFAP	Ethiopia Forest Action Plan.
FAO	Food and Agricultural Organization
IUCN	International Union for Conservation of nature
m.a.s.l	meter above sea level
HHs	Households
MoARD	Ministry of Agriculture and Rural Development
NGOs	Non Governmental Organization
PHC	Population and Housing Census
SPSS	Statistical Package for Social Scientists
SWC	Soil and Water Conservation
UNDP	United Nation Development Program
WB	World Bank
WCED	World Commission on Environment and Development
WFP	World Food Program
PAs	Peasant associations
UNFCCC	United Nation Climate Change Conference
ppt	Precipitation

Abstract

Land degradation is a global phenomenon that endangers the livelihoods of rural farmers at large as well as a country's ability to produce. It is one of the major challenges for agricultural production in Ethiopia. In recognition to this, different land management practices were introduced to combat the problem but effectiveness of these practices was below expectations. Hence, this study attempts to assess the factors that determine land management practices in Girarar Jarso woreda, Oromia National Regional State. Survey questionnaires were administered for 104 systematic random sampling selected sample households. Seven (7) respondents were selected for focus group discussions and nine (9) respondents for key informant interview. The qualitative data was transcribed and analyzed in the form of narration whereas quantitative data were tabulated and summarized by using percentages and frequencies. Frequency, count and percentages were used as ways of data presentation and the results were summarized in the form of tables. The major finding of this study shown that farmers' decision on the adoption and use of introduced land management practices can be influenced by a number of socio-economic and demographic characteristics of households, institutional and physical factors. This indicated that shortage of arable land (53%), topography (28.8%), population pressure (26%)and vegetation cover(21.5%). Besides, traditional land management practices such as falowing(10.2%), manure application(16.3%), contour farming (9.7%)and drainage ditch (13.3%) were more applicable and practiced than the modern land management practices. To create balance between the two practices awareness creation and continuous training, creating opportunities for alternative means of livelihood and promoting NGOs effort to involve in land management practices.

Key words: Land Management Practices, Determinant and Conservation

CHAPTER 1: INTRODUCTION

1.1. Background of the Study

The twenty-first century is a time by which the world is getting seriously confronted by issues of sustainable use of natural resources. Despite the emerging recognition of their decisiveness for the survival of humanity on the planet, these days, water and land ecosystems are being degraded at an alarming rate (Hannam, 2003 cited in Teketel, 2009). The natural environment consists of various valuable natural resources such as air, water, soil, land, forest, flora and fauna that are fundamental to the survival of all of people in the world. However, these resources are under intense pressure from population growth and poor management practices. Land resources are becoming increasingly scarce and the quality of resources such as soil, water, plants and animals are decreasing usually because of land degradation and poor land management practices (Scherr, 2012).The case is worse in developing regions, where the majority of the population depends on these resources for its livelihoods. Hence, the conservation and management of land and water resources for sustainable intensification and agriculture and poverty reduction in developing regions has remained one of the most challenging policy issues for a long time (Bekele et al., 2007). The three inherently interrelated and interdependent land resources, namely, soil, water, and vegetation are in the immediate focus of most local, regional, and international policies, programs, initiatives, covenants, protocols, and conferences that are meant to pave the way to sustainable development. Land is the most important natural resource all over the world. It is a place from which human beings are exploiting a number of resources (Taffa, 2002). Almost all food production for the world population is derived from land, and the need to produce more is increasing from time to time due to an increase in population. For increasing production, either area under cultivation must be expanded or its productivity needs to be increased. Thus, fertility of land is decisive factor in addition to other technological input. However, land is losing its productivity due to a rising trend of land degradation (Woldeamlak, 2003).

In developing countries, factors such as soil quality, land resource availability with fragmented croplands and traditional small-scale farm management systems have a significant impact upon sustainable agriculture and food security (Niroula and Thapa 2005). Agriculture is the backbone of the Ethiopian economy and is given special attention by the government to spearhead the economic transformation of the country. However, land degradation in general and soil erosion in particular still remain the major challenges that are adversely affecting the agricultural performance of the country; hence the call for improved land management practices is urgent issue (Woldeamlak, 2003).

The World Bank (2007) defines land degradation as a reduction of resource potential, the loss of utility or potential utility resulting in temporary or permanent lowering of current or future productive capacity of land. It has been attributed to one or a combination of natural and human processes that act on the land such as water erosion, wind erosion, a long-term reduction in the amount or diversity of natural vegetation, Stalinizations, or sodification. The broad concept of land management practices refers to activities on the ground that uses appropriate technologies for the improvement or maintenance of productive capacity of the land.(McLaughlin, 1988). This includes activities such as soil and water conservation, soil fertility management and controlled-grazing. Sustainable land management approach emphasizes finding economically viable, socially acceptable and ecologically sound solutions at a local level, which could promote participatory land management practices to deal with land degradation. (Yilkal, 2007).

Today, there are vast areas of degraded land in Sub-Saharan Africa leading to greatly reduced productivity. During the 2002-2004 farming seasons in East & West Africa, especially Mali, Burkina Faso, Nigeria, Ethiopia, Somalia and Kenya, annual loss of soil fertility on farmlands can be as high as 100 kg per hectare mainly due to poor farmland management (Ayieko, 2008). Farmlands are the components and homelands of the basic natural resources of the globe and in which the various ecosystems interact with their environment. Thus, farmland management significantly determines the sustainability of natural resource management, and agricultural practices and productivities of a country, mainly where agriculture is the leading economic activity like in Africa in general and Ethiopia in particular.

1.2 Statement of the problem

In Ethiopia, the heavy dependence of people's livelihoods on agriculture and inappropriate use of natural resources resulted in fast and vast land degradation (Genene,2006). On the other hand, development of agricultural sector partly depends on land productivity. However, this resource is seriously threatened by land degradation and aggravates the food insecurity problems in the country through its adverse impact on crop yield. The country could not feed its population at present and it will have difficulties doing in the near future partly due to serious land degradation (Kruger et al., 1997;Genene, 2006). Failure of Ethiopian agriculture to feed the population is partly resulted from cumulative effect of land degradation mainly in the highland part of the country (Kruger et al. 1997;Yohannes, 1999). Therefore, improving productivity of land is so crucial in improving the welfare of the agrarian population in particular, and the overall economy of the country in general (Desta 2009).Without the proper management of land resources; it becomes very challenging for Ethiopia to feed the increasing population. As a result, there should be appropriate land management systems to improve the productivity of land particularly in highland areas where the problem of land degradation is severe (Desta 2009).To solve the problems of land degradation in the country; many efforts have been made since 1970s. A large number of soil and water conservation activities were implemented in different parts of the Ethiopian highlands in the 1970s and 1980s with a huge resource obtained from international community, particularly World Food Program (WFP). However, at the end the intervention couldn't be sustainable and able to bring the intended impact (Yohannes, 1999; Yeraswork, 2000; Woldamlak, 2003). Land management practices are complex issues requiring further investigations as they are influenced by different factors operating at different scales (plots, households, local, regional, national and international). Farm level decision making must be considered as most important in any attempt to understand why land users act as the way they act. It should be recognized that decisions about land management are taken by a broad variety and combination of social actors (Ayalew *et al*., 2009).

Different researchers have done studies on land degradation in different parts of Ethiopia. These researchers have mainly focused on: nature of land degradation; traditional farmers' land management practices, ongoing soil and water conservation by government and other actors; farmers' perception on soil fertility change and on causes of land degradation (Yeraswork, 2000; Eyasu, 2002; Taffa, 2002; Aklilu, 2006; Genene, 2006). Most of these researchers generally found out that there is high degree of land degradation in Ethiopia in general and in the highland areas in particular. However, as far as the researcher's knowledge is concerned, there is a research gap on the issue of what social, economic, and institutional factors determining the land management practices. In an attempt to contribute in bridging the above stated gap, the study would focus on assessing problems and prospects of determinants of land management practice in the in North Shewa Zone with specific case from Girar Jarso *woreda*. The reason why this site is selected is that due to steep slope cultivation, deforestation, inadequate natural resources conservation practices and bad farming system prevailed in the study area resulted in low productivity. However, it is possible to bring land under sustainable land management approaches In addition, in this area; so far no study has been done on issues related to land management practices. To this end, the study attempted to assess such issues as problems and prospects of determinants of land management practices in the study area. (Girar Jarso Woreda Land and Environmental Protection Offices, 2016)

1.3 Objectives

This study aims at the assessment of factors determining the land management practices in Girar Jarso Wereda North Shewa Zone of Oromia National Regional State.

The specific objectives of the study were to:

A. Assess land management practices by the farmers in the study area

B. Identify the determinants of land management practices in the study area.

1.4. Research Questions

a. Are farmers practicing land management in the study area?
b. What are the socio-economic factors affecting land management practices?
c. What are the major land management practices?

1.5. Significance of the Study

The main purpose of this study is to produce academic research. Moreover, it serves as a base for other study which is related to this issue. It May indicate some possible direction for the problems and factors that affect sustainable land use management. This study may use as a source of information regarding the factors affecting sustainable land use management. The study may add new ideas to already existed practice and it also used as a base for further research on similar issues. Furthermore, it may create awareness for the concerned body (governance and others) the practice of sustainable land use management.

1.6. Scope and limitation of the study

Throughout the process of conducting the study, the researcher faced many problems such as: lack of *kebele's* wise well documented land management practices cases and other organized temporal and spatial determinants of land management practices related data over a long period of time, lack of adequate meteorological stations closer to the study area and appropriate data based on the plan of the researcher to get reliable climatic data (temperature and rainfall) for the study area, and reluctance of the sampled respondents to give information. To fill the gaps the researcher used different techniques: for absence of well documented data throughout *kebele,* takes the available data selectively to conduct the interpolation and finally by making strong rapport and systematic approaches, the researcher could get appropriate response from the respondents.

1.7. Organization of the Thesis

This thesis is divided in to five chapters. In the first chapter, the introduction of the paper is presented. This covers background of the study, statement of the problem, objectives of the study, research questions, significance of the study and scope and limitation of the research. Chapter two presents the literature review which encompasses definition of concepts, Chapter three provides description of the study area and the research methodology. Chapter four results and discussion determinants of land management practices in the study area. In chapter five and finally, presents Summary, conclusion and recommendation.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1. Concepts of Land management Practices

The broad concept of land management practices refers to activities on the ground that uses appropriate technologies in the respective land use system for the improvement of the productive capacity of the land. This includes activities such as use of physical SWC measures, soil fertility management practices, controlled grazing, agricultural water management, forestry and agro forestry practices (FAO, 2009). It incorporates the adoption of land use systems through appropriate management practices that enable land users to maximize the economic and social benefits from the land while maintaining the ecological functions of the land resources. It can be seen from economic, social, institutional, political and ecological dimensions. Thus, land management practices emphasize finding economically viable, socially acceptable and ecologically sound solutions at a local, regional, national and global level, which could promote participatory land management practices to deal with land degradation (FAO, 2009). Land management is a complex process, which is not only the result of will or act of land users. Its problems and achievements go beyond the household's domain of operation to include actors in the surrounding environment (Hurni and Yilkal, 2007). It combines technologies, policies and activities that are aimed at integrating socio-economic principles with environmental concern so as simultaneously maintain production, reduce level of risk, protect the potential of natural resources and prevent soil and water degradation, be economically viable and be socially acceptable (Senait, 2002)

2.1.1. Land Management Practices in the World

Land management practices were emerged as an issue of major international concern. This is not only because of the increasing population pressure on limited land resources, demanding for increased food production, but also by the recognition of the fact that the degradation of natural resources is accelerating in many countries of the world. It is also becoming clear that the limits to lands, which are suitable for agriculture, are now being reached. If the lands, which are moderately or well suited for agriculture, are currently in use, then it follows that further increases in production, to meet the food demands of

rising populations, must come about by the more intensive use of existing agricultural lands. To combat the often cited deleterious effects of intensification, particularly with regard to environmental effects requires the development and implementation of technologies and policies, which will result in sustainable land management (Tadesse, 2011). Numerous land management practices are available throughout the world. These practices include physical soil and water conservation measures (soil/stone bunds, check dams, cut-off drains, etc.), biological soil conservation measures such as tree plantation, soil fertility improvement practices (application of chemical and natural fertilizer and agronomic practices such as crop rotation and fallowing), agricultural water management measures, grassland management measures and forestry and agro-forestry measures (Tadele, 2011). Although the immediate causes and impacts of land degradation are generally well understood, it is far too simplistic to say that this understanding leads to the reversal of land degradation. There are many reasons why land degradation still occurs. An appraisal of different land management technologies must therefore take into account not only the technological means involved but also the approaches that are supposed to grant successful implementation of measures, the socio-economic environment, infrastructure, extension and other services, and the socio cultural structures (Shimeles, 2012). Best land management practices that were applied throughout the world increase production and are profitable, cost-efficient with primarily rapid, but must be long-term payback, easy to learn, socially and culturally accepted, effectively adopted and taken up, environmentally friendly and appropriate for all stakeholders including socially marginalized groups (FAO, 2011). The management issues are thus neither merely a technical matter, nor can they be resolved through legislation. It is necessary to address also socio-economic, political and physical aspects of land use and to link interventions to sound land use practices. Similarly many have concluded that land degradation is a widespread problem with a widespread failure of interventions (Fikru, 2009).

2.1.2. Land management practices in Africa

Since agriculture, environment and land management are interlinked, the performance of agricultural productivity and environmental health of a continent, mainly where agriculture is the main stay of the national economy, depend on the appropriateness of the management techniques to be practiced on farm plots. The management practices to be implemented have negative and positive effects. Inappropriate application of land management practices result land degradation problems (Scherr, 2012). In the densely populated regions of Africa, intensification of agriculture is reducing fallow periods and increasing the farming intensity on cropland. On the other hand, limited access to knowledge of viable land management options, lack of capacity to invest in land especially in management practices, and having less ability to bear risk and wait for future payoffs from investment constrained farmers attempt to improve farmlands. As a result, a major part of agricultural land in Africa suffers from intensive cultivation, steep slopes, poor water control and land management, soil erosion and loss of soil nutrients, and is unlikely to support the growing population (FAO, 2011). Land management is the key entry point for improving land resource resilience and productivity within the context of the potentially devastating effects of climate change. It bridging the needs of agriculture and environment, with the twin objectives of maintaining long term productivity and ecosystem functions and increasing productivity of goods and services including safe and healthy food (Tadesse, 2011).

2.1.3. Land management practices in Ethiopia

Land management in Ethiopia has evolved in to various farming systems with different level of intensification (Wegayehu, 2006). In the same way, Ayalneh (2002) point out that a number of SWC techniques have been employed by farmers, most of which have their origin in the traditional knowledge but adapted to the present environmental and social circumstances by experiments through generations. Gete *et al.* (2006) classified the land management practices that have applied in Ethiopia into two broad categories: indigenous and introduced, with different degrees of acceptability, areal coverage and benefits. The acceptance and implementation of these management practices depends on

the desire and willingness of farmers, which in turn request continuous and effective deeds from agricultural experts and researchers. It is not easy, in fact, to put common criteria to categorize land management practices into indigenous and introduced. As a result, this categorization is done based on the direct purposes of the management techniques why farmers apply on their farmlands in the study area (Tadesse, 2011).

2.1.3.1. Indigenous land management practices

Indigenous land management practices are simple structures of a short-term nature that could be reshuffled each year to make use of the soil captured above the structure and avoid rodent production (Genene and Wegayehu, 2010). They are built upon farmers' indigenous knowledge as part of their farming practices that have evolved through the course of time without any outside institutional interventions. These technologies are one of the inherited and transferred from generation to generation (Tolera, 2011). The most perceived and preferred indigenous land management practices include zero-grazing, agro-forestry (woodlot), furrow irrigation, trash lines, grass strips, minimum tillage, contour ploughing, animal manures, fallowing and biological or agronomic methods such as cereal-legume intercropping, crop rotation and mulching, residues of crop production (Ayalew *et al.*, 2009).

2.1.3.2. Introduced land management practices

The introduced type of land management technologies refers to the recommended type of structures, which have standard length, width and height. These structures have specific design requirements and need major investments of labor in construction, often during a single period. In most areas of Ethiopia, new land management technologies were introduced more than two decades ago. During such span of time, the introduced technologies have been under continuous modification, which make it very difficult to trace them back to their origins to compare them with recent development (Tadesse, 2011). The introduced land management technologies in Ethiopia includes soil/stone bunds, bench terrace, inorganic fertilize, check dam, waterways, cut off drains, area closure and closed gullies, hillside terrace, (Shibru, 2010). These technologies are comparatively had long run benefits and importance. However, the hope and desire of the

farmers was to get immediate benefits and to increase production from treated lands in order to continue the practical application of the new technology (Aklilu, 2006). Nevertheless, different studies at different times reached and pointed out those farmers have blamed the new technology. The complains of the farmers are associated with the following drawbacks: its narrowness for ploughing, losses of the substantial lands (out of use), the breeding conditions of rodents and weeds within structure, its difficulty in designing, demands of much labor, encourage for formation of water logging at flat land, solidness at steep slope and artificial water way to form gullies (Eyasu, 2007).

2.2. Determinants of Land Management

Land management is determined by household and village level factors, among others. Household factors include physical, human and social capital, whereas village level factors include population pressure, access to markets, agricultural potential, local markets, presence of programs and local institutions (Pender et al.,2001).Among these the most commonly cited factors include failure to consider indigenous land management practices, high initial costs which are not affordable to poor farmers and also trying to apply uniform techniques in different agro- ecological regions (Aklilu, 2006).There are various technical solutions recommended for managing land towards sustainability. Techniques aimed at erosion control include contour tillage, minimum/zero tillage, construction of physical soil conservation measures, etc.

Soil nutrient replenishment has to be achieved through organic and inorganic fertilizer applications. Traditional erosion control practices, for example; mulch application and long-term fallow management no longer keep pace with the increasing frequency of land use. They include the stabilization of the soil by stone lines, terraces, herbal (grass) strips and various forms of agro forestry measures, for example; planting and management of trees, shrubs and windbreaks hedges .However, these technical solutions alone are not the remedy for the problem (Senait, 2002). Also use of land management practices is determined by political, economic and technical changes. Land management measures need to be adapted to specific landscape characteristics such as soil or terrain/ slope features and to socio-economic circumstances of the largest population.

2.2.1. Natural factors

Of the natural factors causing land degradation, high intensity of rainfall and relief with steep slope are considered to be the major ones. The impact of raindrops, with tremendous amounts of energy, on the bare unprotected soil starts the process of erosion by water (Hudson1981; Morgan 1986). Rainfall with high intensity is particularly responsible for sheet erosion, i.e., the removal of the surface soil in thin layers, or "sheets," or more or less uniformly from a broader area of soil. Soil particles are detached primarily by raindrops impacting the soil and are transported mainly by sheet flow of water. While sheet erosion is the least spectacular in the field, it is the most extensive and probably the most damaging kind of erosion worldwide (Frye 1987). The other important biophysical factor determining vulnerability of soils to erosion is the slope gradient. Particularly, the steep slopes encourage erosion by increasing the volume and the velocity of the runoff and by encouraging the down slope movement of soils due tillage. When runs off rapidly on steep slopes and hence only a limited proportion of the rainwater can infiltrate into the soil, whereas on gentler slopes the slower flow on the surface allows percolation of a large proportion (Belay , 2002).

2.2.1.1. Farm size

Farmers with larger farm sizes are expected to practice better land management practices. This is because when farmers have larger farm sizes, they can plan different management practices due to the large land holding size. Earlier studies conducted by EEPRI (2002) indicate that farmers with larger farm size were less likely to be engaged in long-term land management practices. Insecurity feeling of farmers with greater holding was presented to be justification for the negative effect of large farm size. Another previous study indicates farm size to have positive and significant influence on adoption of Introduced stone terraces, but the same study identified farm size to have significant negative influence on continued use of introduced stone terraces (Aklilu, 2006).

2.2.1.2. Slope of the land

Slope increases the probability of using improved soil conservation and land management technologies. It implies that farmers are inclined to invest conservation practices where their farm plots are located in higher slopes. This is due to expectation of more benefits from conservation and high rate of soil loss on steeper slope farm plots than others. This means that on sloppy plot the impact of soil erosion would be more visible to the farmers and this force them to construct appropriate measures and take remedial action. This suggests that conservation efforts should target areas where expected benefits are higher, like on the steeper slopes, in order to encourage use of conservation technologies (Assefa, 2009). Steeper slope has been found to have a positive effect on the decision of conservation strategies of land management. Empirical studies in different parts of Ethiopia reported a positive and significant effect on slope of a plot on the decision of conservation strategies of land management (Aklilu, 2006). The perception of farmers on soil erosion and measures to be taken to combat it is highly related to the slope of the land. This shows that slope is determining factor to management decision Tesfaye (2003).

2.2.1.3. Climate

Climate has direct and indirect impacts on land management practices. The types and intensity of the management practices to be implemented at a given plot of land depends on the nature of the climate and topography where the land is located (Girmay *et al.*, 2008). Farmers have a long record in adapting to changes in rainfall and temperature over time. Future changes in the climate could have significant impacts on agriculture that will challenge farmers to adapt to changes in land management practices, land use, commodity production and its location UNFCCC, (2008). Climate variability and change can contribute to land degradation by exposing unprotected soil to more extreme conditions, making current land management practices unsustainable (through increased rainfall/flooding) or through inducing more rapid conversion of land into unsustainable practices and straining the capacity of existing land management practices to maintain resource quality, contributing to de-vegetation, soil erosion, depletion of organic matter and other forms of degradation (TerrAfrica, 2009). On the other hand it may offer new

opportunities for productivity and land management practices such as reforestation, improved water management, integrated soil fertility management, agro-forestry and improved rangeland management. Climate, change has been identified as one of the most crucial factor that affects land management practices (IPCC, 2007).

2.2.2. Socio-economic and Institutional Factors

There are different socio-economic and institutional factors that are causing land degradation. These factors are causing land degradation through their impact on the decision of people regarding land use and management practices. Some of these factors include population pressure, poverty and landholding system.

2.2.2.1. Population Pressure

An increasing rate of population growth is among the major causes of land degradation in Ethiopia. This is because the increasing population leads to the requirement of more agricultural production, which requires more land with the existing technology level. Getting this new agricultural land is not a simple task and it resulted in the expansion of farming activities to erosion prone marginal areas, serious deforestation, a decrease in fallow period and continuous cultivation (Habtamu, 2006; Hussien, 2006).Dense population and inappropriate farming practices combined with intensive rain and rugged topography intensified land degradation problem in the country. The high population growth made steep fragile areas to be included into cultivation, thus accelerating rate of soil erosion (Betru, 2003). The country has already lost its forest resources, mainly due to population pressure. Different scholar as cited in Hussien, (2006) indicated the declining trend of forest cover in Ethiopia through time. In the 1960s, Brieten (1961) estimated that about 37% of the total area of the country was covered by forest. UNDP, FAO and MOA (1984) estimated that at the beginning of 2oth century about 35.4% of the country's landmass was covered by forest. IUCN (1990) also estimated that 87% of the highland area of the country was covered by natural forest in the early 2oth century and reduced to 15% in 1955 and to 4% in 1984. NCS (1990) and EPA (1997) further estimated the country's current forest reserve to be less than 3%. The annual rate of deforestation in the country is estimated to be 80,000 to 200,000 hectares (Gete, 2002). EFAD (1994 cited in

Hussien, 2006) also estimated annual rate of deforestation in Ethiopia to be 150,000 to 200,000 hectares. Another author (Badeg et al,2003) also estimated deforestation rate of natural forest at 160,000 - 200,000 hectares perannum. The increasing population, which leads to increasing demand for more agricultural land, fuel wood, construction material and other forest products, is the major cause for this deforestation (Gete, 2002).

This deforestation caused shortage of firewood and other forest products. Consequently, people are using animal dung and crop residue for household fuel rather than being added to the soil to improve soil fertility. This in turn reduces the quality of soil and thus further exacerbates the problem of environmental degradation (Badeg et.al, 2003; Hussein, 2006; Aklilu, 2006).Nevertheless, population pressure can also have positive impact on land improvement and environment protection. By increasing the value of land relative to labor, population growth may induce labor-intensive investments in land management and soil management. These include planting trees, constructing terraces, composting and mulching, etc (Pender, 1998 cited in Desta 2009)

2.2.2.2. Poverty

Poverty and natural resource/environmental degradation are negatively reinforcing, that is, as the land is degraded, agricultural productivity is lowered, resulting in decreasing incomes and food security. This in turn leads poor people from both rural and urban areas to engage in activities that further degrade the land resources and environment in order to obtain supplementary incomes and to sustain a living. (Badeg et al., 2003). Poverty is very likely to contribute to land degradation for many reasons. When people lack access to alternative sources of livelihood, there is a tendency to exert more pressure on the limited resources available to them. There is intensified pressure on the natural resources. One of such pressures is land degradation. The situation has led to drought and reduced household assets (Shiferaw and Holden.1999). As a result, deforestation, burning of dung and crop residues is increased due to people's inability to afford or lack of alternative fuel sources. For example, electricity and kerosene are expensive and in most cases not available for the rural people. Even households with electricity supply avoid using it except for lighting at night. For cooking, most households prefer the three stone open

fire. This is believed to be only about 10 percent efficient in the overall thermal energy production and use. Improved stoves such as improved biomass, fuel saving stove, etc are believed to be around 45-82 percent more efficient than the three stone open fire. However, they are not used since they are not affordable by rural households (Lakew et al., 2000).Without adequate alternative sources of energy, population growth increases the demand for fuel wood, which in turn leads to the destruction of forests. It also contributes to the use of crop residues and animal dung for fuel rather than using them as source of organic fertilizer to improve the soil. This situation is true in the highland areas of Ethiopia where-by about ninety-four percent of the peasant households meet their principal energy demanded from fuel wood and dung (Lakew et al., 2000; Badeg et al., 2003).

2.2.2.3. Land Tenure

Several aspects of land tenure arrangements influence farmers' decisions with regard to land management, including tenure security, whether land is managed privately or communally, land holding size and fragmentation, and the ability to transfer land by sale, lease or bequest. Tenure security determines the extent to which farmers may benefit from investments made to improve the land. In the extreme case in which farmers expect to hold land for only the current season, they will have no incentive to invest; rather, their incentive is to get the maximum that they can from the land, even if that means undermining its future productive capacity. More generally, farmers may expect to use land for an undetermined period of time, but consider that there is some risk that they will lose this right in the future. The greater the risk of losing the right, the lesser likely they are to invest, or to conserve the productive capacity of the land (Feder et al, 1988). It is important to recognize that tenure security does not necessarily require private land title or even private ownership. There is substantial evidence from elsewhere in Africa that farmers can be secure in access to a given pieces of land and make investments on it without having title, and even where land is communally owned (Plateau, 1996). What is recognized is recognition and respect of the right of an individual or well defined group to continue to use a given piece of land may exist under communal or private tenure and whether or not such rights are officially sanctioned by the state through titling or other

means. Communal tenure may undermine incentives to manage land in a sustainable manner for other reasons. Where land is managed collectively, 'free rider' problems may undermine the incentive of individual to contribute to successful collective action. On the other hand, communal tenure allows community members to take into account the cost of one farmer's management decisions on other community members, or social or equity considerations that may not be adequately accounted for under private tenure (Plateau, 1996). Small land holdings and land fragmentation may undermine farmer's interest in undertaking some types of land improvements regardless of tenure security or private management. The ability to transfer land can have several impacts on land management. Land sale and leasing allows land to be used by farmers who are able to earn the highest return from it, perhaps because of greater access to scarce factors of production. The ability to transfer land may provide greater incentive to invest in land improvement, since this increases the farmer's ability to recoup the value of such investments or extends the time period during which investments may yield meaningful benefits (Pender and Kerr, 1997).

2.2.2.4. Policy/Institutional Support Related Factors

Appropriate policy environment is the pre requisite for being able to implement natural resource management process that satisfy the objectives specified by the interested profits. Government policies are not translated in to action unless there is the political will to make them work. Therefore, the situation in many countries today is that plans are made for the conservation of natural resources but they have little practical effect. Whatever the historical background, many developing countries have sizeable portion of land that was previously reserved. As the authoritarian management has decline, population pressure and land hunger have increased. So has the chance of evading punishment for illegal encroachment on reserved land. The restriction of land was often to preserve the income or power of the ruling elites; there are also many examples where the land was deliberately withheld from settlement because it was ecologically unsuitable.

2.2.3. Socio-cultural factors

In the past, there was enough land for everyone to have some, and an increase in population just means to bring more land in to use. Getting this new land is not a simple task and it resulted in the expansion of farming activities to erosion prone marginal areas, serious deforestation, and a decrease in fallow period and continues cultivation (Habtamu, 2006; Hussen, 2006). Many people in developing countries can barely eke out a living from their land by hard work such as a hard tillage. They know that traditional management has kept them and their predecessors alive, and that they have nothing to spare for gambling on a new method. It is difficult for them to change their techniques even for immediate benefits such as higher yields and less soil loss. It is still more difficult for them to adopt a practice that requires an investment, especially if the benefits are delayed or disturbed over several years. The establishment of conservation practices under such conditions requires a reliable guarantee that those people will not starve to death if the new practice fails (Napier and Summers, 1993 cited in Troeh et al, 1999). Short - term tenancy prevents the adoption of many desirable practices.

Theoretically, the landowners should be willing to invest in sound long term practices, but many owners are too far removed from the land to realize what practices are needed. Short- term tenancy makes it easy for both tenants and owners to overlook problems, when those problems reach a critical stage. Another constraint to the sustainability of conservation practices is social significance of cattle population. The part played by livestock in adding pressure on the land resource base varies a great deal from one country to another. In area where cattle are symbol of status, evidence of wealth and have religious significance, focus is given to quantity than quality. Associated with this are low standards of livestock management and low level of production. The total effect of these combined factors is unnecessary stress on the ecological system.

The study adopts Pender, Jagger, Nkonya, & Sserunkuuma (2001)'s conceptual framework that postulates that land management is determined by household and village level factors, among others. Household factors include physical, human and social capital, whereas village level factors include population pressure, access to markets,

agricultural potential, local markets, presence of programs and local institutions. The framework generally shows the complex interplay of these factors at different levels and how they influence land management practices which in turn affect agricultural production.

2.3. Conceptual Framework

Socio-economic factors influence the adoption determinants factors on land management practices. These factors not only affect households' perception as to land management practices but also influence the attitude towards SWC activities (Fikru, 2009). Physical conservation measures are labor intensive technologies. Hence, household size influences the land management practices to undertake the conservation measures given household labor is the whole supplier of the required labor. Education influences farmers' decision to adopt technologies by enhancing farmers' ability to obtain, understand and utilize the practice, and by improving overall managerial ability of farmers (Aklilu, 2006). Physical factors besides affecting farmers' decision on land management practices, they may influence household's decision to use and adopt appropriate type and number of SWC measures (Tesfaye, 2003). Slope of a field affects the rate and amount of soil loss. This forces farmers to control or mitigate the impact of erosion on fields that are situated in steep slopes and hence slope influences the decision of farmers to undertake conservation measures (Habtamu, 2006). Farmers residing close to their farmplots invest more on soil conservation measures. This is because farm land closer to the residences receives more attention and supervision than land that is situated at a distance (Wagayehu, 2003). Adopting conservation measures can be expensive and risky as physical conservation measures impose higher cost in terms of the land they put out of production. Hence, farmers with small landholding use higher discount rate to compare benefit and cost of conservation treatment and this result in likelihood of dis-adoption decision (Long, 2003. Farmers will not be interested to invest in soil conservation measures when the land tenure is too insecure so that the benefits of soil conservation may not accrue to them (Belay, 2010). Affecting many of these socio-economic and institutional factors (and often affecting farmers' decision directly) is government policies on infrastructure and market development, input and credit supplies, land tenure, agricultural research and extension, conservation programs, land-use regulation, local governance and collective

action, and non-governmental programs (Desta, 2012). Hence, the following analytical framework depicted the most important variables expected to influence farmers' use of certain land management practices taking in to account the specificity of Girar Jarso woreda.

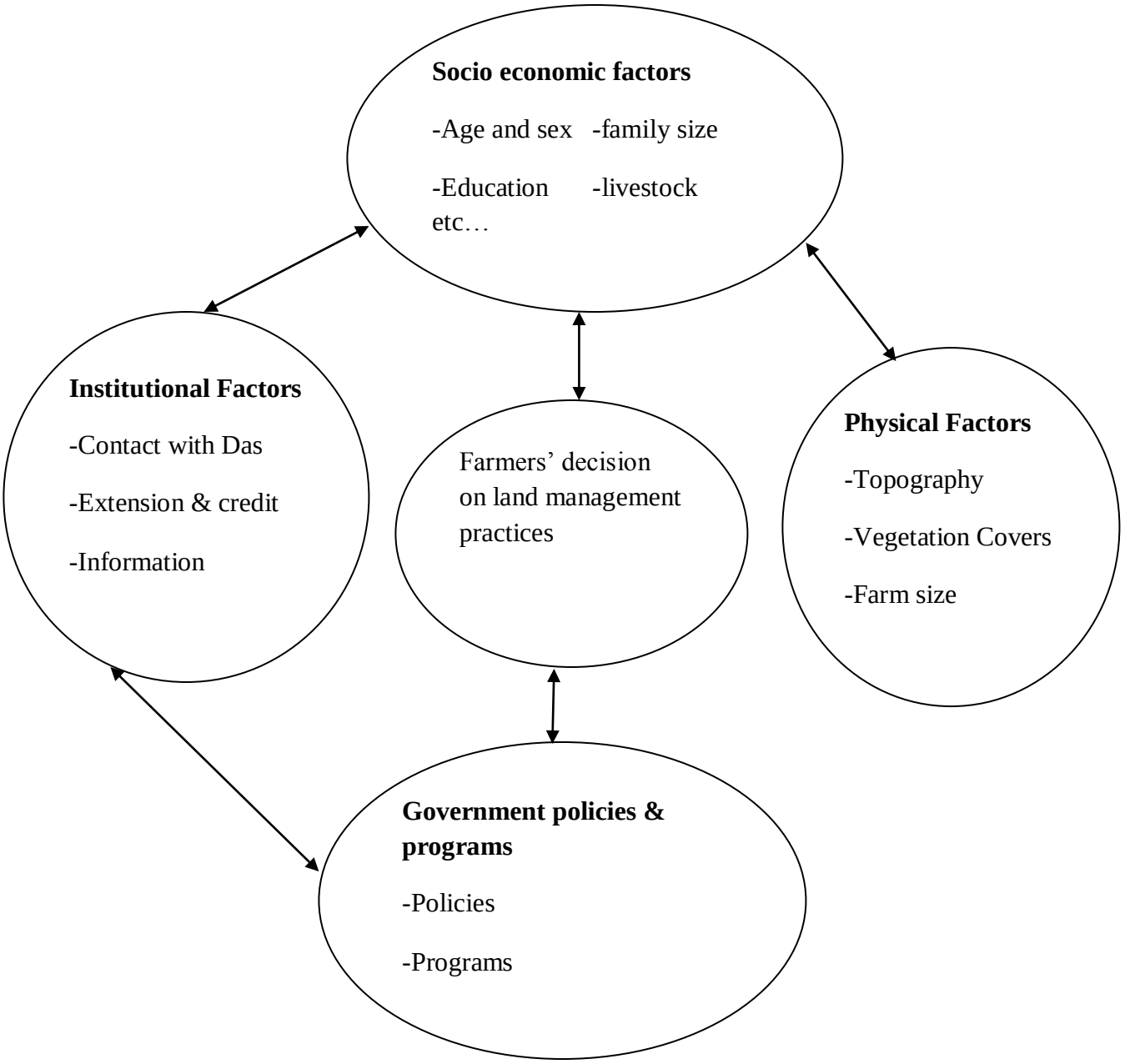


Figure 2.1. Conceptual frame work of the study

CHAPTER 3: RESEARCH METHODS AND METHODOLOGY

3.1. Description of the study area

3.1.1. Location

The study was carried out in Girar Jarso Woreda one of the thirteen woredas of North Shoa zone, Oromia National Regional State. The woreda lies along the high way to East Gojjam(Amhara National Regional State) in the North western direction at the distance of 112kms from Addis Ababa .It shares border with Amhara National Regional State in the north, Yaya Gulalle woreda in the east Debre Libanos woreda in the south , and Degem woreda in the west. Astronomically the woreda occupies 9^0 35'to 10^0 00' N latitude and 37^0 to 39^0 24'E longitude. (Girar Jarso woreda Agricultural Development and Natural Resource Office,2015).

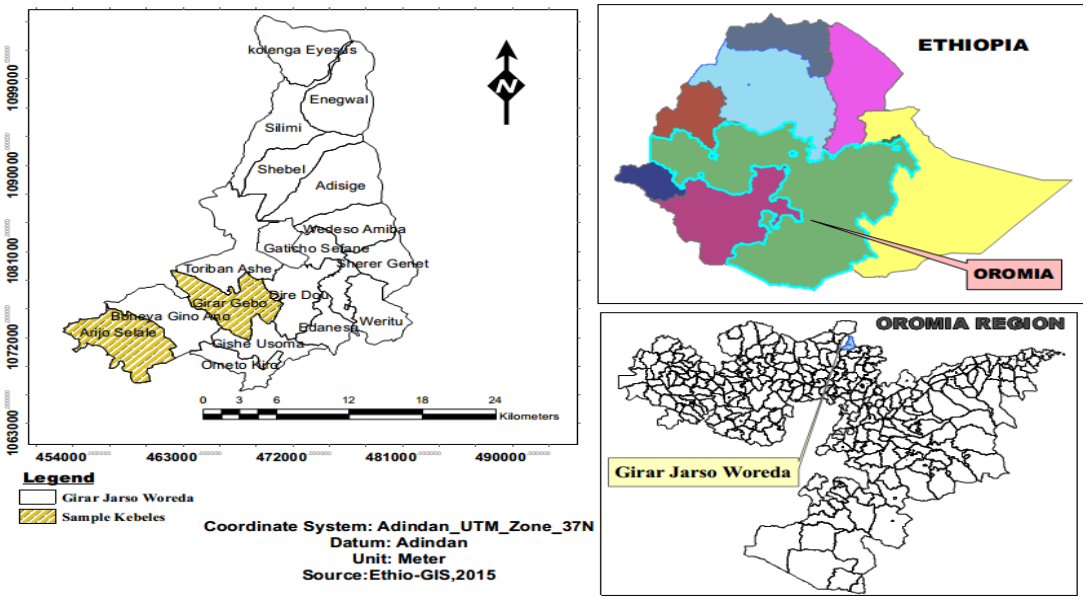


Figure 3.1. Location Map of the Study Area

3.1.2. Topography, Climate and Soil

The largest part of Girar Jarso woreda is part of the sho an plateaus. The land features of the woredas' characterized by flat land, mountainous, sloppy to steep sloppy and gorges. About 36% of land area is flat while, the proportion of the total area that is considered as

sloppy is about 33%and the remaining 31% is classified as mountainous and gorges. The altitude of the woreda ranges from 1300m to3419m above sea level (m.a.s.l). The lowest elevation is found in Northern while, the highest elevation is found in the western part of the woreda. Agro-ecologically, the woreda is sub divided into three major altitudes such as : the high land (*bada*) which contain 52%, the mid- high land (*bada dare)* with 41% and (gamoji) with 7% of total land of the woreda's about 49435 hectares.(Girar Jarso Woreda Agricultural Development and Natural Resource Office 2015).

Climate is one of the element of the physical environment which has a pronounced impact on settlement pattern, human life , the type of the soil ,fauna and flora. Therefore, the climatic data of the study area was collected from National Metrological Agency in terms of monthly minimum and maximum temperature and rainfall. Then the monthly mean and annual climatic data was computed for the study area and other surrounding stations to carry out interpolation. Therefore, the mean minimum and mean maximum monthly temperature of the study area is in the ranges between 5.79 to 9.75 and 17.93 to 23.13 respectively as shown on (Figure . 3.2)

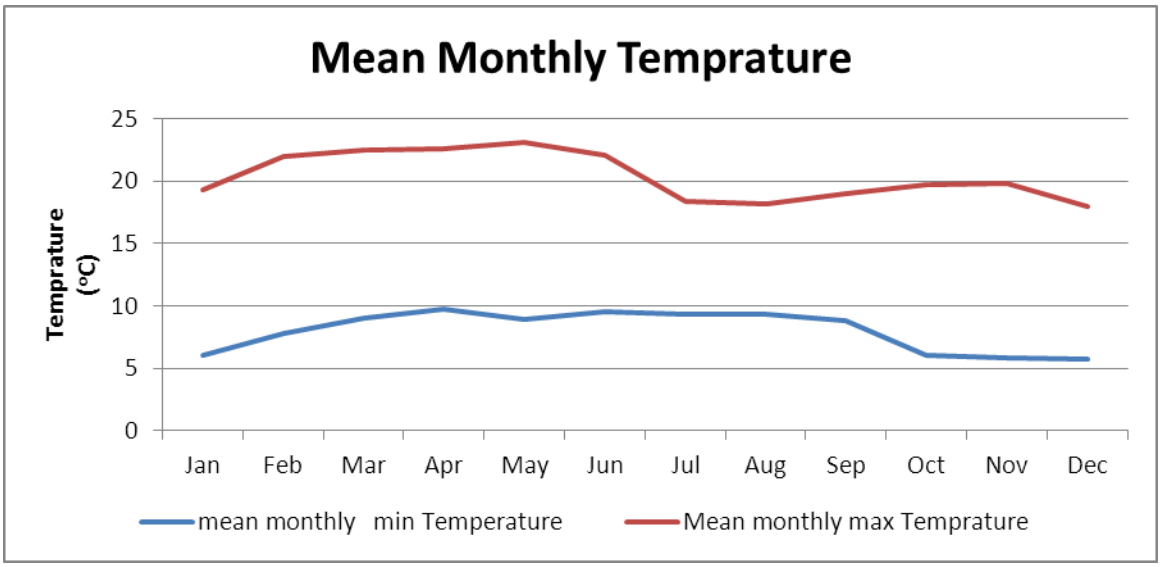


Figure 3.2. Mean monthly min and Mean monthly max Temperature (c^{o}) for Girar Jarso Woreda (2004-2014)

Source: National Meteorological Agency

The rainfall pattern of the study area, the mean annual rainfall is about 84.64mm with uneven and scarce occurring four or more times yearly. According to the data that collected from NMA, the rain fall of the area ranges from 11.94mm in December to 366.58mm in July. The study area has two rain seasons. The main rain season, which accounts for the largest total rainfall of the year occurs from June to August during summer season, the other rainfall season is from February to April (*Belg)* and during this time, the area receives small amount rainfall.

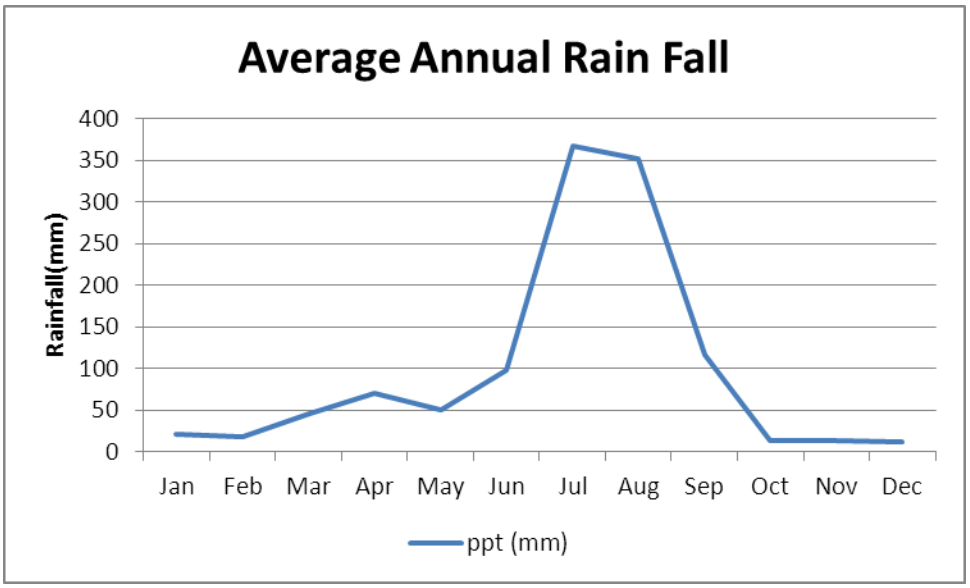


Figure 3.3. Annual Rain Fall values (mm) for Girar Jarso Woreda (2004-2014)

Source: National Meteorological Agency.

The dominant types of soil in the study area are Vetisols80%, Nitosols38%, Cambisols11%and other types are about 13%. With regard to land use pattern, the researcher observed from basic data of woreda agriculture that cultivated land covers the largest share, 71 percent while grazing land is the second largest land use pattern that covers 11 percent. About 8 percent of the woredas' land area is unproductive 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. (Girar Jarso Woreda Agricultural Development and Natural Resource Office, 2015).

3.1.3. Population, land use and agriculture

The population size and their distribution vary from the history of early human settlements. High population pressure existed in the middle altitude where human being was settled first and in lowland areas, the distribution of population was low scattered. The total population of the woreda is 83070 while, 42536 are male and 40534 are female. The population of the sampled two PAs where 1211are males and 859 are females.(Girar Jarso woreda Health Office,2015/16).

Table 3.1. Land use pattern of Girar Jarso woreda , 2015

No.	Land use	Coverage in hectares	Coverage in %
1	Arable Land	37006	75
2	Grazing Land	7910	16
3	Forest land	739.378	1.62
4	Construction land	813	1.64
5	Bushes land	122	0.24
6	Land for Park	1.622	0.oo
8	Unproductive land	2720	5.5
9	Others	123	0.24
	Total	49435	100

Source: Girar Jarso Agricultural Development and Natural Resource office, 2015

The main economic activity of the population of the woreda is mixed farming at subsistence level producing both crops and livestock. Farming is main livelihood strategy of the woreda in which seasonal rain fall pattern determined the production activity. More than 90% of the population depends on subsistence farming as livelihood strategy. In Girar Jarso woreda , *belg* crop production accounts14% while, *meher* crop production accounts about 86% .Hence,*meher* crop production is the major livelihood strategy that people engaged in (WAO,2015). The major crops produced in the woreda include: Cereals crops such as teff (Eragrostis tef), wheat ,barley, maize and sorghum , horticultural crops such as fruits, vegetables, root crops, pulses include bean, peas, field

pea, lentils and vetch. Besides, oilseeds such as linseeds and *nug* (*Guizotia abyssinica*) are growing. Besides , food consumption when there is surplus product crops are used as income generating .

Livestock rearing is also another livelihood activity in which households engaged as a source of food cash income and draft power in the study area. The total livestock population is shown on table 3.4.

Table3.2. Livestock's population of Girar Jarso woreda

No.	Livestock category	Total Number
1	Cattle	162135
2	Sheep	57853
3	Goats	20520
4	Horses	3097
5	Mules	505
6	Poultry	99000
7	Beehives	-
	Traditional	3435
	Transitional	816
	Modern	795

Source: Girar Jarso woreda Agricultural Development and Natural Resource Office, 2015.

3.2 Research Design

According to Dawson (2002), Research design is the conceptual structure within which research would be conducted. Accordingly, both qualitative and quantitative research methods were employed in this study. To achieve the objectives of the study, descriptive survey research design were employed as an appropriate research method. This is because descriptive research method was found to be worth importance in describing and explaining the exact and actual situation of the issue under investigation. Moreover, to

get the general picture of the issue under study, "**Mixed Research Method Design**", specifically was employed. The central premise of employing this design was that jointly using both qualitative and quantitative design approach provides a better understanding of the research problems than either research approach alone.

Mixed method research designs serve for the purposes of triangulation, complimentary, illustration of data and off-set weaknesses and providing stronger inference; and employing such approach can also allow for the limitations of each approach to be neutralized while strengths are built upon thereby providing stronger and more accurate inferences (Bryman, 2012; and Creswell, 2014).The research design, sampling procedures, methods of data collection and the sources of data were discussed below.

3.3. Sources of Data

For the purpose of this study, both primary and secondary sources of data were employed. The major sources of primary information for the study were from household, DA's ,woreda experts and elders. Moreover, regarding the main sources of secondary data policies, strategy documents, government guidelines, books, journals, and other official documents such as, reports of land management practices, CSA documents, and the like were consulted to understand the current situation of the issue and to triangulate data obtained from different sources so as to maintain the validity of the data obtained, which in turn enrich the findings of the study.

3.4 .Sample population and Sampling Techniques

The target population for the study was household head populations within GirarJarso Woreda. The woreda has 17 Kebeles where two kebeles (namely; Ellamu and GiraGeber) by employing purposive sampling technique of their land management activities. Then the former was ranked first among the whole kebeles of the woredas'in land management While, the latter was ranked least in the activities of land management in the woreda. In the kebeles'Indigenous types of land management practices were as it was but, the introduced types of land management practices practiced highly. After selecting targeted kebeles' sampling interval (K) was determined by dividing the total number of house

hold in the population by desired sample size of each kebelenext, a number was selected between one and the sampling interval (K) using systematic random sampling. Similarly, Agricultural Experts, Development Agents and Kebele Administrators were involved in the study using the same method. Lastly, a total number of respondents were included in (Table 3).

Table 3.3: Sample Size Distribution

Sample Kebele	Total Household	Sample Household
Illamu	1061	53
Girar Geber	1009	51
Total	2070	104

Source: Girar Jarso woreda Agricultural Development and Natural Resource Office, 2015/16

3.5. Data Collection tools

Data for study were collected from primary and secondary sources. Primary data was obtained through questionnaire, interview, focus groups discussion and observation. Secondary data collected from various publications, document analysis from relevant zonal and woreda offices.

3.5.1 Questionnaire

Regarding the house hold survey, structured questionnaires, with both open and closed ended questions were designed .This solicited information on background socio-economic characteristics of the respondents, land management practices employed by farmers, determinants of land management practices and other related issues. The questionnaires were per-tested to check their validity and adjustments were necessary. Since the households in the study area speak *Afan Oromo*, the questionnaires that were initially prepared in English were translated to *Afan Oromo.*

3.5.2. Interview

Interview involves a series of open ended questions on the land management practices, determinant of land management practices and other related issues. The open-ended natures of the questions define the topics under investigation and provide opportunities to both interviewer and interviewee to discuss some topics in more detail. If the interviewee has difficulty in answering a question or provides only a brief response, the interviewer used clue or could prompt them to encourage the interviewee to consider the question further. In a semi- structured interview the interviewer also has the freedom to probe the interviewee to elaborate on the original response or to follow a line of inquiry introduced by the interviewees.

3.5.3. Focus group discussions

For the focus group discussion (FGD), the researcher selected seven (7) respondents from model farmers and elders based on socially respected within the society and who are known to have better knowledge on the present and past environmental, social and economic status of the study area. The purpose of FGD was to get insights on and understand the determinant of land management practices in the study area.

3.5.4. Key Informant Interview

The purpose of interview is obtaining more information to strengthen the responses gained from the questionnaire. Semi-structured interview was conducted due to its flexibility to raise new question based on the response of the interviewee in the study area. As a result it was conducted with nine (9) key informants involving one respondent from each Kebele Administrators, Development Agents and Agricultural Experts. To avoid language barriers the interview was conducted in Amharic and finally translated to English for analyzing and interpretation.

3.5.5. Observations

Observation techniques were methods by which an individual or individuals gather first hand data on programs, processes, or behaviors being studied with photographs. It has

been used to gather primary information with regard to the current conditions of land management practices, the observable of land management, determinants of land management and the surrounding environmental conditions relating to the integration between indigenous and modern land management practices through careful observation around the lands of the study area.

3.6. Method of Data Analysis

The data gathered via the above aforementioned tools were analyzed quantitatively and qualitatively. The qualitative data obtained through interviews, FGD, observation, and others were analyzed and incorporated in the analysis to supplement and substantiate the data secured through questionnaires. Then, based on the nature of basic research questions and the data collected, various techniques of analysis were employed. Regarding the data that were collected through questionnaires were analyzed by using descriptive statistics like percentages, frequencies and graphs

CHAPTER 4: RESULTS AND DISCUSSIONS

This section discusses the results relating to the socio-economic characteristics of the respondents, the nature of land degradation, land management practices employed by farmers and their determinants.

4. 1.Background Characteristics of the Respondents

4.2. Demographic characteristics

The demographic features of the respondents play its important roles in determining land management practices. In line with this, the researcher focused to use demographic variables such as age, marital status, and sex. These variables are discussed below:

4.2.1. Age of the Respondents

Age of the respondent is one of the very important variables in identifying determinants of land management practices under man made factors. The summary of age of respondents is presented in table 4.1.

Table 4.1 Percentage distribution age of the respondents

Age	Frequency	Percent
20-40 early adulthood	37	35.6
40-60 middle adulthood	64	61.5
60 years and above late adult hood	3	2.9
Total	104	100.0

Source: Field Survey, 2016

Table 4.1 shows that about (35.6%) of the respondents were in the early adulthood age group of 20-40 years,(61.5%) respondents were in the middle adulthood age of 40-60 years, and only (2.9%) of respondents were in the late adulthood age group of 60 and above years. From this one can conclude that the majority of the respondents were in the middle adult hood age group of 40-60 years.

4.2.2. Sex of the Respondents

Being male or female has its own implication in identifying the determinants of land management practices of the given area. Hence, knowledge of sex in the given study is crucial. Accordingly, sexes of respondent in the study area are depicted in Table 4.2.

Table 4.2 Percentage distribution of the sex of respondents

Sex	Frequency	Percent
Male	85	81.7
Female	19	18.3
Total	104	100.0

Source: Field Survey, 2016

Table: 4.2 shows that about 81.7% were male respondents, while about 18.3% were female respondents. Thus, from the above information the majority of respondents were male respondents.

4.2.3. Respondent Marital Status

Regarding the marital status of sample respondents the majority 78.8% are married, 6.7% are divorced of different cases, 1.9% are single and the remaining 12.5% are widowed (Table 4.3.)

Table 4.3.The Marital Status of the Household Respondents

Marital status	Frequency	Percent
Married	82	78.8
Single	2	1.9
Divorced	7	6.7
Widow	13	12.5
Total	104	100.0

Source: Field survey, 2016

4.2.4. Family Size

Table 4.4 shows that about 33.7% have household size of less than five, about 63.5% of the respondents have a household size of 5-9 members and only 2.9% have a household member. . Thus, the majority of the respondents have 5-9 household family members and only 3respondents (2.9%) have 10 and above (ten) household size. On average the study area almost exceeding the national average of rural household size which is 4.9 as of CSA, (2008) census report. The household size indicates the level of crowding, and thus coping capacity in a community. Household size may also be related to the socio-economic status, which determines the status of rural land management. The larger the household size, greater are the chance of deforesting land and/or degrading farm land. On the other hand, larger households represent critical social networks and manpower, which may be valuable in emergency situations (Cutter et al., 2003). Large household size may mean availability good number of agricultural laborer.

Table 4.4. Household size distribution

Household size	Frequency	Percent
0-4	35	33.7
5-9	66	63.5
10 and above	3	2.9
Total	104	100.0

Source: Field Survey, 2016

4.3. Socio- Economic Characteristics

4.3.1. Educational Status

The educational status of a society, particularly literacy level, is among the key factors determining development and growth (Todaro and Smith, 2009). It may also enable the household to have broad vision of the surrounding environment. Survey results indicate that the education level of the respondents nearly a half percent of the sample household

were unable to read and write,34.6% more or less can read and write with attending adult education formally,7% got up to grade 4, while the remaining 13.5% attained above 4th grade. This may indicate some incapacitation in their ability to adopt new ideas and technologies.

Table4.5. Percentage Distribution of Literacy Status of the Household Respondents

Educational Level	Frequency	Percent
unable to read and write	47	45.2
Adult literacy	36	34.6
Grade 1-4	7	6.7
Grade 5-8	9	8.7
Grade 9-10	5	4.8
Total	104	100.0

Source: Field Survey, 2016

Education status of the respondents directly or indirectly influences the conditions of sustainable land use management in the study area. According to data gathered from house hold respondents, some of them do not know the role of land management practices towards the environment. The education level indicates resistance to a hazardous incident as better knowledge on the origin of events and about the methods to cope with them to reduce risk. Education level also has strong relation to the socio-economic status (Cutter *et al.* 2009).

4.3.2. Livestock Ownership

Farmers 'livestock holding size could be considered as one indicator for better availability of resources or resource endowments. On the other hand better availability of resources is assumed to have positive impact in farmers 'land management practices. Hence, greater livestock holding is expected to have positive influence in farmers' behavior to improve their land management practices. Livestock plays a critical role for supporting communities involved in the mixed crop livestock production system through

a range of products and services. Respondents were asked about number of cattle, small ruminants and pack animals owned this year (currently). The above Table4.6.Illustrates that 45 (43.3%) of the respondents do have 6-10 number of livestock. Livestock in general, is an integral part of the farming systems and they are particularly important for increasing the resilience of vulnerable poor people subjected to climatic and income shocks. This is possible through spreading risk and increasing assets. The loss of livestock, especially ox is critical as it not only ruins the asset base, but also deprives the general productive capacity of the households. Thus, the ownership of livestock is often used as an indicator for wealth and food security. Oxen used for plowing and threshing, cow are for milk, beef and hides. Donkeys are widely used as transport animals and for petty trade, horses used for riding. Poultry are widely kept and used for egg production and home consumption. Goats and sheep kept for sell to secure cash and for consumption.

Table 4.6.Number of Livestock of the Respondents

No. of Livestock	Frequency	Percent
1-5	24	23.1
6-10	45	43.3
11and above	35	33.7
Total	104	100.0

Source: Field Survey, 2016

According to focus group discussants, the communities perceive having large number of livestock as disadvantageous because of the shortage of feed and revealed that those have no livestock‘s were highly depend on forest and forest products as their source of income. This in turn leads them to destruct the natural resources which were the causes for land degradation. This affects the sustainability of land management. Key informants revealed that previously, the major livestock feed in the study area was grazing, but now that has changed and crop residues have become the most important source of livestock feed. They highlighted that increasing human population has resulted in the

encroachment of grazing areas by crop farming. Key informants however lamented the use of crop residue for livestock feed: they noted that it aggravates soil nutrient depletion as it diverts crop residue that would have been used for soil fertility management. Complete removal of crop residue can cause a large drain on the nutrient stock, decline in soil fertility.

4.3.3. Land ownership

Table 4.7 .shows that 90(86.5%) of household respondents were have their own land whereas small or large in hectares while 14(13.5%) were not have their own land except homestead area.

Table 4.7.Land Owning percentage of Respondents

Do you have your own land?	Frequency	Percent
yes	90	86.5
no	14	13.5
Total	104	100.0

Source: Field Survey, 2016

Regarding economic activities, survey results show that agriculture is the mainstay of the study area and that all the sample respondents' had access to land. The average land holding size for the respondents was 1.5 hectares. Focus group discussions revealed that respondents do not have sufficient land to feed their families. The need for additional land varies from 0.50 hectare to 3 hectares based on the family size and current landholding size of the needy households.

4.3.4. Land holding size

Farmers with large farm size are expected to practices better land management practices. This is because when farmers have large farm size, they plan different management practices due to the large land holding size.

Table4.8. Respondent Land Size in Hectares

land holding size in hectares	Frequency	Percent
≤ 0.5	18	17.3
0.51-1.00	28	26.9
1.01-1.5	32	30.8
≥ 1.51	26	25
Total	104	100

Source: Field Survey, 2016

As summarized in Table 4.8, about 17.3 percent of the respondents owned land ≤ 0.5hectares, 26.9 percent of the households owned land ranges from 0.51-1.00 hectares, 30.8 percent owned land between1.01-1.5 hectares and 25 percent ≥ 1.51. Under current production technology, as justified by different researchers, this holding size is too small to produce adequate grain for a household in the country as a whole. Provided that the present rapid population growth continues unabated, the scarcity of farmlands will be more severe in the future and the corresponding grain production per household will undoubtedly be affected.

4.3.5. The Nature of Landform

Characteristics of landforms are among the key factors that affect land management in a given area. In view of this, landform characteristics of the sample household heads are considered, mainly in terms of slope. Survey results show that 41 (39.4%) of the respondents cultivate flat land; 13(12.5%) gently sloping; 33 (31.7%) moderately sloping and the remaining 17 (16.3%) steep sloping.

Table4.9. Percentage Distribution of Respondent on the nature of land form in their area

the nature of land form	Frequency	Percent
flat land	41	39.4
gentle slope	13	12.5
moderately sloping	33	31.7
steep slope	17	16.3
Total	104	100.0

Source: Field survey, 2016

Key informants and focus group discussions revealed that more than half of the farmers are cultivating erosion prone areas. It was revealed that there are some sloppy areas that shouldn't be under cultivation due to their nature, but are now coming under cultivation due to population pressure. This is a major challenge that seems to intensify land degradation.

Figure 4.1. Sloppy area used for cultivation in Girar Geber



Source: Field Suvey, 2016

4.4. Land Management Practices in the Study Area

Land management programs in the study area have two major parts: without and with government subsidies. In the first case, land management practices on crop lands are thoroughly implemented by the farmers' themselves without any financial or material support from the government or NGOs. Land management practices in this case are indigenous and transferred from generation to generation and their investment costs are completely covered 34 by the farm households. For the second case, land management activities outside cultivable plots such as gully stabilization, check dam construction, and hillside terraces are supported by PSNP programs and considered as introduced practices (Tadesse, 2011). The classification may be, actually, controversial. This is because the functionality and effectiveness of a particular land management practice differs through spatial and temporal variation as well as cultural and technological differences. As a result, for this case, with the help of the farmer's experience who are primarily engaged on farming land management practices that are developed by farmers and time honored are categorized into indigenous methods. Contrarily introduced methods are grouped into introduced methods (Tadesse, 2011).

According to Table 4.10. Households used various biological and physical conservation strategies of land management. These include manure applications (16.3%), crop rotation (38.1%), Drainage Ditches (13.3%), fallowing (10%), contour farming (9.7%), check dam (7.9%), soil /stone bunds (15.2 %), Cut off drains (9.3%)

Table 4.10: Households Response on Land Management Practice

Types of conservations	Frequency	Percent
manure applications	72	16.3
crop rotation	80	18.1
drainage ditches	59	13.3
fallowing	45	10.2
contour farming	43	9.7
stone /soil bund	67	15.2
cut of drainage	41	9.3
check dam	35	7.9

Source: Field survey, 2016

4.4.1. Indigenous land management practices

Crop Rotation

Survey results revealed that about 18.1%of the respondents have applied crop rotation as conservation measure. Crop rotation is mainly a common practice exercised by many farmers as compared to other practices both in the middle altitude and low land areas for soil fertility maintenance, weed and diseases control. The sequence of rotation is not similar in all agro-ecology, because it depends on crop grown in the area.

Fallowing: Survey results shown that, about 10.2% of the respondents have applied it as a conservation measure. This method is practiced in the sample kebeles, where land is plentiful. However, according to interview results its application is becoming lesser because farmers need the land to grow crops every year to produce crops for the increasing of population as they have shortage of land.

Manure: Manures (dry animal wastes) combined with straws that are remnants of plants used for animal fodders are important land management practice. Manure also includes the byproducts of local food production processes like *atela* (the by-product of local brewing) and others, which are daily swept out of a house in dirt forms (Tadesse, 2011). According to survey results, 16.3% of the surveyed households use manure in the study area in order to improve the fertility of the soil. However, farmers used manure mainly to farm plots that are near to the homestead. From this one can conclude that distance of farm plots from the homestead has a significant influence on manure application.

Contour farming: Contour farming is a common traditional practice of tilling the land along the contours of the slope in order to reduce the runoff on steep sloping lands. It is used separately or in combination with other conservation structures such as plantation trees and cut- off drains (Desta, 2012).Survey results shown that only 9.7% of the respondents applied the structure in combination with other structural conservation practices. It is carried out using the ox-drawn plough as part of the normal farming activity hence; it needs no extra labor and time for construction.

Drainage ditches: Drainage ditches are one of the widely used conservation practices in the study area and also known as traditional ditches. These are micro-channels constructed on cultivated farms to drain off excess water and control soil erosion. Construction of drainage ditch is part of the normal ploughing activity in these low cost measures. However, unlike the plough furrows, the ditches are made wider and deeper in dimension and usually run diagonally across the field. Locally farmers in study area, call the drainage ditches "*Boy*i".

4.4.2. Introduced land management practices

Soil/Stone bund: Soil/Stone bund is an embankment or ridge built across the slope (Figure 5) especially around the mountainous areas. In the study area, 15.2% of the respondents have constructed soil/stone bunds in the common eroded lands. Farmers mostly use soil/stone bunds that are impermeable to maintain all rainfall but when overtopped at one location will cause gullies unless they have specially designed spillways to protected soils below.

Figure4.2. Field with stone/ soil bund in Ellamu kebele



Source: Field Survey, 2016

Check Dams: Check dams are built in the gully systems to harvest water and sediment. Survey results showed that, about 7.9% of the respondent's participated construction of check dam. In the study area rill and gullies are very common and the community use stone, soil, gabion and cement to construct the check dams. After the check dam is constructed it filled by soil and water then the community specially young farmers use the water for small scale irrigation as well as planting permanent trees on the side of the check dams. Check dams are the most effective practices of SWC measures that help to plug the gully and rills and to increase the wetness of the soil. It is constructed by farm households in the support of WFP to harvest water and sediments.

Figure 4.3. Check Dam in Ellamu sub watershade



Source: Field Survey, 2016

Cut off drains: Cut off drains is one of the physical structures constructed by digging the soil deep in order to divert the runoff before reaching the farmland. It was constructed during dry season to avoid impediment to land preparation for main cropping season. This structure is a graded channel constructed mainly in moist areas to intercept and divert the surface runoff from higher slopes to protect downstream cultivated land or village (Fikru, 2009). On the contrary, cutoff drains in dry areas are used to divert runoff and additional water into cultivated fields to increase soil moisture. The farmer constructed such structures to prevent loss of seeds, fertilizer and soil due to excessive run– off coming from uplands and disposed excess water from the field. However, according to farmers' opinion, most of these structures are accelerating soil erosion through time. During a transect walk with DAs gullies associated with the construction of these structure especially between the boundaries of plots were commonly observed. Farmers in the study area are therefore, reluctant to install this type of SWC practice.

4.5. Determinants of land management Practices

Table4.12. illustrate determinants factors of land management practices 28.5%,26.0% and 21.8% of respondents responded topography, population growth and vegetation cover are the main determinant factors respectively,15.4% of the respondents were responded purpose of land use as a determinant factors of land management practices, 8.7% of respondents were responded lack of awareness as a determinant factors of land management practices .From this one can understand that topography is the main determinant factors of land management practices in the study area.

Table 4.11.Percentage of Determinant factors of Land Management practiced in the study area.

What are the determinant factors of land management practices in your area?	Frequency	Percent
topography	30	28.8
vegetation	22	21.5
population growth	27	26.0
purpose of land use	16	15.4
lack of awareness	9	8.7
Total	104	100.0

Source: Field survey, 2016

4.6. Dominant of Land Management Practices

Table1.13. shown that of the total respondents 69(66.3%) responded farming system as a dominant practices of land management while, 35(33.7%) of respondents responded terracing as dominant factor of land management practices in the study area. Focused group discussion and key informant revealed that except for steep slope area at which erosion is very high the most dominant practices of land management in the study areas terracing i.e. both soil and Stone bunds.

Table4.12. Percentage of Dominant Practices of Land Management in the study area

Which one of is the dominant practice of land management in your area?	Frequency	Percent
Terracing	35	33.7
farming system	69	66.3
Total	104	100.0

Source: Field Survey, 2016

4.7. Problem of Land Management Practices

As shown in Table1.14. 56(53.8%) of the respondents were responded that shortage of arable land is the crucial problem of land management practices, 21(20.2%) of respondents responded lack of awareness, 16(15.4%) respondents were responded unemployment as a problem of land management practices and 11(10.6%) of the respondents were responded lack of improved technology.

Table 4.13. Percentage distribution of Problem of Land Management Practices

What is the crucial problem of land management practices in your area?	Frequency	Percent
lack of awareness	21	20.2
shortage of arable land	56	53.8
Unemployment	16	15.4
lack of improved technology	11	10.6
Total	104	100.0

Source: Field Survey, 2016

Focused group discussion and key informant state that shortage of arable land is the crucial problem for practicing various land management practices in the study area.

4.8. Awareness of Modern Land Management Practices

As shown on Table 4.15.of the total respondents 97(93.3%) were responded yes, there are others modern land practices of land management .While, 7(6.7%) of the respondents were responded that there is awareness on modern practices of land management in the study area.

Table4.16. Percentage distribution of Respondents on awareness of Modern Land Management Practices applied in the study area

Are there any other modern practices of land management in your area?	Frequency	Percent
yes	97	93.3
no	7	6.7
Total	104	100.0

Source: Field Survey, 2016

Focused grouped discussion revealed that there were other modern land management practices which were not implemented due to the fact that they are expensive and labor intensive.

Key informants revealed that previously, various simple types of terracing in traditional ways and various traditional farming systems were applied, but now that has changed to various types of soil and water conservation mechanisms such as level bund, graded bund, terrace trench, using gabion and the like .

4.9. Agricultural input used

Table (4.17) showed that, 71(68.3%) of the respondents responded that use fertilizer (organic or chemical) agricultural practice and input used on the farm plot and use the land in sustainable manner. About 21(20.2%) of the respondents responded that improved seeds as one of the agricultural input. About 12(11.5%) of the respondents indicated that pesticides and insecticides are agricultural practice and input use on the farm land to sustainable land use management. Form the above malformation one may conclude that fertilizers (organic /chemical) are agricultural practice and input that are used on the farm plot for sustainable use of land resources.

Table 4.15. Percentage of respondents on kinds of agricultural practice and input used on farm plot

Kinds of agricultural practice and input used on farm plot	Frequency	Percent
fertilizers	71	68.3
improved seeds	21	20.2
pesticides and insecticides	12	11.5
Total	104	100.0

Source: Field Survey, 2016

4.10. Access to agricultural extension services

Regarding access to extension services, about 70.2% of the respondents were access to some types of extension services (Table 4.17.). These services include technical advice on the utilization of chemical fertilizer, improved seed and pesticides; and better farming methods.

Table 4. 16. Percentage distribution of respondents about access to agricultural extension services

Do you have access to extension services	Frequency	Percent
Yes	73	70.2
No	31	29.8
Total	104	100.0

Source: Field Survey, 2016

Focus group discussions revealed that extension workers focused mostly on the promotion of inorganic chemical fertilizer and improved seed utilization. Key informants further revealed that there are efforts to supply improved variety of heifers and poultry and also provide technical assistance on animal fattening.

Besides, farmers' training was identified as a challenge. Survey results indicate that only a few farmers have attended farmers training courses and these are mostly of short duration hence impinging on their effectiveness. Only 28 survey respondents have ever participated in farmers' trainings: 23 were trained for 1 to 4 days; while 5 were trained for relatively longer periods. The trainings focused on issues like construction of physical soil and water conservation structures (check dam and terrace construction), seedling raising and planting of trees, application and use of chemical fertilizers and preparation of compost manure. While the courses offered are of good nature, their minimal implementations seem to impinge on farmers' ability to apply sound land management practices.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

Land management practices can be influenced either by natural factors or/ socio-economic factors highly. In the study area these two explanatory variables were assessed. The major findings explored natural factors and socio-economic factors were determining land management practices. The data obtained from field survey depicted that topography and vegetation cover were the major among natural factors in determining land management practices and population growth and lack of awareness among socio-economic were greatly influenced land management practices in the study area.

The FGD results and key informant interview made also confirmed that population growth was one of the main challenges in affecting sustainable land use management in the study area.

Regarding traditional and modern land management practices, both traditional and modern land management practices were applied in the study area even though their scale is different. Most of the respondents indicated crop rotation as most important traditional practices of land management. But, the rests of the respondents mentioned manure application, water way, contour plowing and fallowing. The extent of use of traditional land management practices indicated that crop rotation, manure application, , water way, contour plowing and fallowing

The focused group discussions and Key informants confirmed that traditional land management practices highly applied in the study area while, the far fewer usage of fallowing is not unexpected as many of the respondents due to lack of awareness about the practices and shortage of land holding .

Besides, modern land management practices which were depicted from field survey were stone/ soil bund, check dam and cut off-drain, has been mentioned by respondents. Most respondents were responded that stone/soil bund as main practices among modern land management practices and the rests were used in small amounts.

Key informant confirmed that stone/soil bund as dominant practices among the modern land management practices in the study area.

Regarding dominant land management practices in the study area more than half of the respondents (66.3%) were confirmed farming system than other types of land management practices. This is because of any farmer was use at least one type of the practice at a time.

The focused group discussions and key informants made also confirmed that farming system as dominant practices than others. They explained this for instance, terracing was resisted by few farmers due to its tiresomeness and cost.

Concerning the problems of land management practices depicted at a field survey such as lack of awareness, shortage of arable land, improved technology and unemployment about 53.8% of the respondent indicated shortage of arable land as the crucial problem of land practices.

Focused group discussions and key informants replied that more than half of the farmers in the study area are practicing crop production in erosion prone areas and still there is an expansion of cultivation in to marginal lands due to population pressure. This expansion of farming towards marginal area resulted in turns the shortage of grazing land, deforestation and increasing trend in land degradation.

Among current practices, Fertilizer (organic or chemical), improved seeds, pesticides and insecticides are agricultural practice and input used on the farm.

The Focus Group Discussion participants replied that scientific fertilizers (inorganic or chemical) are very danger for land. It kills some important naturally decomposers insects and makes it dry. Instead, crop rotation shed cropping, mixed farming and fallowing systems were the most important systems in managing land.

5.2. Conclusion

The general objective of this research is to assess factors that determining land management practices in Girar Jarso Woreda Oromia Regional State. The findings of the study indicated that topography, vegetation cover, population growth, purpose of land use and lack of awareness shown as main factors that determining land management practices. Out of these, population growth was found as a main factor.

Age of farmers, sex and livestock holding are also identified to have positive impact on modern agricultural input. Educational level of the society affect household decision which determines the welfare of the society such as income, health, and their attitude towards using land management practices. It enabled the household to have broad vision of the surrounding environment. According to data gathered from house hold respondents, some of households do not know the role of land management practices towards the environment. Livestock plays a critical role for supporting communities involved in the mixed crop-livestock production system through a range of products and services. In land management practices, the role of livestock was seen as both positive and negative effects of land use management practices. On the one hand, having many livestock minimized households from using forests and forest products their source of income, which force them to destruct natural resources. On the other hand, many livestock leads overgrazing that has negative effects.

It can therefore be concluded that in making interventions in land management practices, there should be active participation of local stakeholders, primarily the farmers. This helps to integrate indigenous land management practices with the new techniques and enhance easy adoption and sustainable use of effective introduced practices.

However, in designing sustainable land management programs, local specific factors need to be given due attention. Thus, a comprehensive study at macro or national level on determinants of land management practices can have a significant role in getting better understanding on the issue. Such macro-level studies can also serve as a guide to local level studies on determinants of land management practices. Hence, concerned actors should give due attention to the importance of conducting research specific to determinants of land management practices at national level.

5.3. Recommendation

The findings of the research indicate that there is increasing trend in determinants of land management practices problem in the study area. Different land management activities are being practiced in order to conserve resource base and to maximize agricultural production. Even if these efforts were made by government and NGOs, none of the interventions can efficiently curb the problem. Therefore, based on the finding of the research, the following actions that are believed to play significant role in improving land management practices and solving and/or at least minimizing problems are recommended.

- ✓ In association with the increased population pressure a number of adverse effects on the environmental conservation of the study area and land management practices have been identified. Easing population pressure on natural resource dependence needs due attention. This can be achieved by continuous training and awareness creation on family planning, technological improvements in agriculture and development of other sectors of the economy to minimize burdens on natural resource.
- ✓ In making land management practices there should be active participation of local people primarily farmers. This helps to integrate indigenous land management practices with the new ones and enhance easy adoption and sustainable use of effective introduced practices. In addition, it is also essential to provide benefits to the local communities from enclosed area in sustainable manner which, in turn, increased the sense of one's resource.
- ✓ To improve the productivity of the farmland focus should be given to intensive technique of agricultural system that promote the use of various soil fertility improvement and conservation practices to boost production from small plot of land. In addition, women should be encouraged to put manures in farm fields rather than using it for fulfilling fuel wood demand.
- ✓ The need for a flexible extension program me is necessary to broaden the concept of land management practices

REFERENCE

Aklilu Amsalu and Alebachew Adem. 2009. Assessment of climate change-induced hazards, impacts and responses in the southern lowlands of Ethiopia, Forum For Social Studies Report No. 4, Commissioned by CORDAID, Addis Ababa, Ethiopia.

Aklilu, A. (2006). Caring for the Land Best Practices in Soil and Water Conservation in Beressa Watershed, Highlands of Ethiopia. Tropical Resource Management Papers, No. 76.

Alemayehu Tafesse (2006). Water Shade Management Approach in Reversing Soil Degradation; Ethiopian Experience and Lessons Learnt. The Role of the River Nile in poverty Reduction and economic Development in the Region, Proceedings of the Conference held at the United Nations Economic Commission for Africa Conference Hall Addis Ababa, Ethiopia, November 30-December 2, 2006, Nile Basin Development Forum 2006 (NDBF- 2006).

Alemneh Dejene (2003) .Integrated Natural Resource Management to Enhance Food Security; The Case for Community Based Approaches in Ethiopia, Environment and Natural Resources Working Paper No. 16, FAO, Rome.

Assefa Derebe. 2009. Assessment of Upland Erosion Processes and Farmer's Perception of Land Conservation in Debre-Mewi Watershed, Near Lake Tana, Ethiopia: A Thesis Presented to the Faculty of Graduate School of Cornell University in Partial Fulfillment of the Requirements for the Degree of Masters of Professional Studies.

Ayalew Ali, K. Deininger, Stein Holden and J. Zevenbergen. 2009. Rural Land Certification in Ethiopia: Process, Initial Impact, and Implications for other African countries. World Development, 36(10), 1786–1812.

Ayalew Ali, K. Deininger, Stein Holden and J. Zevenbergen. 2009. Rural Land Certification in Ethiopia: Process, Initial Impact, and Implications for other African countries. World Development, 36(10), 1786–1812.

Ayalneh Bogale. 2002. Land Degradation, Impoverishment and Livelihood Strategies of Rural Households in Ethiopia: Farmers' perceptions and policy implication, unpublished PhD. Dissertation; Vol. 8. Shaker Verlag, Germany. Belay Ayele. 2010. The Effect of Rural Land Certification in Securing Land Rights: The Case of Amhara Region, Ethiopia; unpublished Master Thesis, The Netherlands.

Badeg Bishaw and Abdu Abdel Kadir (2003) Agro forestry and community Forestry for Rehabilitation of degraded water shades on the Ethiopia highlands, International Symposium on Contemporary Development Issue in Ethiopia, July 11-12, 2003 Addis Ababa, Ethiopia

Bekele Shiferaw, Okllo J., and Reddy, R.V. (2007). Adoption and Adaptation of Natural Resource Management Innovations in Smallholder Agriculture: Reflections on Key Lessons and Best Practices, Springer Science + Business Media B.V. 2007

Berhanu, G. (2008). *Determinants of Agricultural and Land Management Practices and Impacts on Crop Production and Household Income in the Highlands of Tigray, Ethiopia*. Journal of African Economies, V.17 (3):395-450.

Betru Nedassa. 2003. Soil and Water Conservation Program in the Amhara National Regional State. In: Tilahun Amede (ed.) Proceeding of a Conference on Natural Resource Degradation and Environmental Concerns in the Amhara National Regional State: Impact on Food Security. P. 109-125, Bahir Dar, Ethiopia. Central Statistical Agency (CSA). 2008. Summary and Statistical Report of the 2007 Population and Housing Census, Federal Democratic Republic of Ethiopia, Population Census Commission, Addis Ababa.

Betru Nedassa. 2003. Soil and Water Conservation Program in the Amhara National Regional State. In: Tilahun Amede (ed.) Proceeding of a Conference on Natural Resource Degradation and Environmental Concerns in the Amhara National Regional State: Impact on Food Security. P. 109-125, Bahir Dar, Ethiopia.

Betru, (2003).Soil and Water Conservation Program in the Amhara National Regional State. In: Tilahun Amede (ed.) Proceeding of a Conference on Natural Resource Degradation and Environmental Concerns in the Amhara National Regional State: Impact on Food Security.

Bryman, A. (2012). Social research methods (4th ed.). Oxford, UK: OUP.

Creswell, J. W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.). Boston, MA: Pearson.

Cutter, S.L. and C. Finch, 2008. Temporal and spatial changes in social vulnerability to natural hazards. *PNAS* 105 (7): 2301-2306.

Desta Damena, 2009. Determinants of Farmer's Land Management Practice: The case of Tole District, South West Shewa Zone Oromia National Regional State, A Thesis Submitted to School of Graduate Studies,

Desta Damena. 2012. Determinants of Farmers' Land Management Practices: The Case of Tole District, South West Shewa Zone, Oromia National Regional State, Ethiopia. *Journal of Sustainable Development in Africa (Volume 14, No.1, 2012).*

Endris Damtew. 2006. Comparative Financial Evaluation of Soil Conservation Measures in North Wollo: The Case of Golo River Catchment, Habru Woreda, M.Sc. Thesis Haramaya University, Haramaya. Eswaran, H.R., Lal, and P.F., Reich. 2001. Land Degradation: An over view in: Bridges, E.M., I.D., Hannam, and L.R., Oldeman. Responses to Land Degradation.

Ethiopian Economic Association/Ethiopian Economic Policy and Research Institute (EEA/EEPRI) (2002). A Research Report on Land Tenure and Agricultural Development in Ethiopia, Addis Ababa.

Ethiopian Economic Policy and Research Institute (EEPRI). 2002. A Research Report on Land Tenure and Agricultural Development in Ethiopia, Addis Ababa. Ethio-GIS. 2014. Projection: WGS_1984 _UTM_Zone_37.

Eyasu Adane. 2007. Farmers' Perceptions on Soil Erosion Problems and Conservation Practices: The Case of Banja Woreda in Awi Zone, Amhara Regional State, unpublished MA Thesis, Addis Ababa, Ethiopia FAO. 2009. Country Support Tool – for Scaling-Up Sustainable Land Management in

FAO. 2009. Country Support Tool – for Scaling-Up Sustainable Land Management in Sub-Saharan Africa. Food and Agriculture Organization of the United Nations, Rome, Italy. FAO. 2011. The State of the World's Land and Water Resources for Food and Agriculture; Rome.

FAO. 2011. The State of the World's Land and Water Resources for Food and Agriculture; Rome.

Fikru Assefa. 2009. Assessment of Adoption Behavior of Soil and Water Conservation Practices in the Koga Watershed, Highlands of Ethiopia: A Thesis Presented to the Faculty of the Graduate School of Cornell University in Partial Fulfillment of the Requirements for the Degree of Master of Professional Studies.

Genene Tsegaye and Wegayehu Bekele. 2010. Farmers Perception of Land Degradation and Determinants of Food Security at Bilate Watershed, Southern Ethiopia; South Agricultural Research Institute (SARI), P. O. Box 06, Hawassa, Ethiopia; Dire Dawa University, Dire Dawa, Ethiopia.

Gete Zeleke (2002).Resourse Use and Poverty in the Ethiopia Highlands. In: Tilahun Amede (ed.) Proceeding of a conference on Natural Resource Degradation and Environmental Concerns in the Amhara National Regional State: Impact on Food Security.p 109-125. Bahir Dar, Ethiopia

Gete Zeleke, Menale Kassie, John Pender & Mahmud Yesuf. 2006. Stakeholder Analysis for Sustainable Land Management (SLM) in Ethiopia: Assessment of Opportunities, Strategic Constraints, Information Needs, and Knowledge Gaps. African Studies Serious A16. Beren Switzerland: Geographica Bernensia.

Girmay Gebremichael, B. R. Singh, Mitiku Haile, T. Borresen and R. Lali. 2008. Land Degradation and Development: Carbon Stock in Ethiopian Soils in Relation to Land Use and Soil Management, Wiley Inter Science, DOI 10.002/Idr Volume 27, No.6 Springer, Rome Italy.

Grar Jarso Woreda Agricultural and Rural Development Office and Land Environmental Protection; 2014.

Habtamu Ertiro. 2006. Adoption of Physical Soil and Water Conservation Structures in Anna Watershed, Hadiya Zone, Ethiopia, unpublished Master Thesis Addis Ababa University.

Habtamu, E. (2006). Adoption of Physical Soil and Water Conservation Structures in Anna Watershed, Hadiya Zone, Ethiopia. (Masters Thesis Addis Ababa University, 2006).

Hurni and Yilkal. T. 2007. Integrating Indigenous Knowledge with Modern Technologies for Sustainable Land Management: The Case of Soil and Water Conservation and Soil Fertility48 Improvement Practices in Enerata KPA, East Gojja, unpublished Master Thesis, Addis Ababa University.

Hussen Haycho(2006). Land Use Change and Challenges of Land Degradation in Adaba Area, Bale Zone, A Thesis Submitted to School of Graduate Studies, Institute of Regional and Local Development Studies, AAU

HussenHaycho(2006). Land Use Change and Challenges of Land Degradation in Adaba Area, Bale Zone, A Thesis Submitted to School of Graduate Studies, Institute of Regional and Local Development Studies, AAU

IPCC (Intergovernmental Panel on Climate Change), 2007. Summary for Policymakers in Climate Change 2007: *Cambridge University Press, Cambridge.*

Kruger.H, Berhanu Fantew,Yohannes GebreMichael and Kefeni Kejela (1997) Inventory of Indigenous Soil and Water Conservation Measures on Selected Sites in the Ethiopian highlands, University of Bern, Center Development and Environment, Switzerland.

Lakew DestaTadesse, 2000, "Pool of indigenous Techniques in the Management of Land Resources: Inventory of Traditional Soil and Water Conservation Measures in the northwestern part of Ethiopia". In Feoli, E. et al(eds.) Sustainable Development of Dryland Areas of East Africa: proceedings of the International Workshop , Addis Ababa, November 9 th -12 th 1998.

Long. L. 2003. Conservation Practices Adoption by Agricultural Land Owners: PhD Dissertation; Northern Illinois University, Delealb, Illinois.

McLaughlin, J.D. 1988. *Land Information Management*, Clarendon Press: Oxford. ISBN 0-19-858404-0

Mulugeta, (1999). Determinants of adoption of physical soil conservation measures in central highlands of Ethiopia.The case of three districts of Selale.M.Sc.Thesis Presented to the School of Graduate Studies of Alemaya University.pp.65-69.

Pender, J., F. Place, & Simeon Ehui. 2006. Strategies for Sustainable Land Management Lesson from the East African Highlands, International Food Policy Research Institute and World Bank, Washington, DC., USA.

Pender, J., Jagger, P., Nkonya, E. &Sserunkuuma, D. (2001). Development Pathways and Land Management in Uganda: Causes and Implications, Environment and Production Technology Division. International Food Policy Research Institute, 2033 K Street, N.W. Washington, D.C. 20006 U.S.A.

Pender, J., Place, F., &Ehui, S. (2006). Strategies for Sustainable Land Management in the East African Highlands, International Food Policy Research Institute, 2033 K Street, N.W. Washington, D.C..

Plateau,JP. (1996) The Evolutionary Theory of Land Rights as applied to sub Saharan Africa a critical assessment. Development and Change, 27(1) 29-86.

Scherr, S.J. 2012. Downward spiral: Research evidence on the relation-ship between poverty and natural resource degradation: Food Policy 25,479–498.

Senait (2002). The economics of managing land resources towards sustainability in the High lands of Ethiopia. PhD Dissertation. University of Hohenheim, Germany.

Senait Regasa. 2002. The economics of managing land resources towards sustainability in the highlands of Ethiopia. Unpublished Ph.D. dissertation. MargrafVerlag Germany. 138p.

Shibru Tefera. 2010. Land Degradation and Farmers' Perception: The Case of Limo Woreda, Hadiya Zone of SNNPR, Ethiopia: unpublished M.Sc. Thesis Addis Ababa University.

Shiferaw, B., and S.T Holden. 1999 "Soil and Erosion land Small holders' conservation Decisions in the Highlands of Ethiopia" World Development 27(4) 739-752

Shiferaw, B., and S.T Holden. 1999 "Soil and Erosion land Small holders' conservation Decisions in the Highlands of Ethiopia" World Development 27(4) 739-752

Shimeles Damene. 2012. Effectiveness of soil and water conservation measures for land restoration in the Wello area, northern Ethiopian highlands. Ph.D. dissertation. Wilhelms University, Bonn, Germany. Sirinka Agricultural Research Center, Meteorological Station, Climate Data, june, 2014

Tadele Mamo. 2011. Impact of Productive Safety Net Program on Asset Accumulation and Sustainable Land Management Practices in the Central Rift Valley: The Case of Adami Tulu Jido Kombolcha and Meskan Districts: unpublished MSc. Thesis, Haramaya University, Haramaya.

Tadesse Dejenie. 2011. Assessment of the Practices and Aspects of Farmland Management in Gozamen Wereda, East Gojjam Zone, Amhara Region, Ethiopia: M.Sc. Thesis, Addis Ababa University.

Taffa Tulu (2002). Soil and Water Conservation for Sustainable Agriculture, AA.

Teketel Abuto (2009) .The Socio-Economic and Institutional Dynamics of Integrated Water shed Management, The Case of Kanat and Magera Micro Water Sheds, Amhara National regional State, A Thesis submitted to school of graduate Studies, College of 'development studies (Rural lively-hood and Development), AAU. The ecology of sustainable development. *The Ecologist*. Vol.20(1).18-23.

TerrAfrica. 2009. Land and Climate: The role of land management for climate change adaptation and mitigation in Sub-Saharan Africa. Available at http://www.africaclimatesolution.org/features Land Climate_Executive_Summary.pdf. Oct. 15, 2014.

Tesfaye Beshah. 2003. Understanding Farmers: Explaining Soil and Water conservation in Konso, Wolaita and Wollo, Ethiopia. Tropical Recourse Management papers No, 41. Wageningen University, Netherlands.

Tolera Megersa. 2011. Assessing the role of Traditional Land Management Practices in Improving Cropland Productivity; the case of Diga Woreda, East Wollega Zone, Oromia Regional State, Ethiopia, unpublished M.Sc. Thesis, Ambo University. United Nations. 1997. Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, New York.

UNFCCC. 2008. "Challenges and Opportunities for Mitigation in the Agricultural Sector: Technical Paper", FCCC/TP/2008/8 FAO, Rome Italy.

Wegayehu Gashaw. 2006. Determinants of Farmers' Decision on Soil and Water conservation practices in Dire Dawa Administration, M.Sc. Thesis, Haramaya University.

Woldamlak Bewket (2003). Towards Integrated water shade Management in Highland Ethiopia the Chemoga Watershed Case Study. Tropical Resource Management. Paper, No 44/2003

World Bank (2007b). Ethiopia: Accelerating Equitable Growth Country Economic Memorandum Part II: Thematic Chapters. Poverty Reduction and Economic Management Unit; Report No. 38662-ET.World Bank (2007b). Ethiopia: Accelerating Equitable Growth Country Economic

Yeraswork Admassie (2000). Twenty Years to Nowhere; Property Rights, Land Management and Conservation in Ethiopia, The Red Sea Press, Inc, Asmara

Yohannes Gebremichael (1999). The Use, Maintenance and Development of Soil and Water Conservation Measures by Small-Scale Farming Households in Different Agro-Climatic Zones of Northern Shewa and Southern Wollo, Center for Development and Environment, University of Berne, Switzerland in Association with the Ministry of Agriculture, Ethiopia Research.

Appendices

Addis Ababa University

College of Social Science,

Department of Geography and Environmental Studies.

Appendix I: Survey Questionnaire

Dear respondents:

This questionnaire is prepared for acquiring information to conduct research for partial fulfillment of Master of Arts in Geography and Environmental studies (Land and Resources Management). It has objectives, for the assessment of factors determining the land management practices to be filled by sampled households reside in Girar Jarso woreda. Significantly, it provoke local administrators, and the farmers of Girar Jarso woreda to look for appropriate measures to meet and grasping all important area of concern in which peoples minimize the impact even eliminate the adverse effect on land management practices.

General Directions

- No need of mentioning / writing name on questionnaire
- Information you provide regarding vulnerability assessment, by any means not harm your personal life and it is solely used for this research and confidential.
- This study is conducted for the benefits of all peoples in the Gira Jarso woreda, so that no money offers for information sources.
- Data collection procedures all in all depend on your volunteer. Therefore, you are entitled either to participate or not to participate in survey.
- Circle your response for the given structured questionnaires and write you response on space provided for semi-structured once.

I. Back ground information of the respondents

1. Name of kebele FA's_____

2. Age of the head of house hold_____

3. Sex 1. Male 2. Female

4. Marital status 1. Single 2. Married 3. Divorced 4. Widowed/er

5. Household size_____

6. Educational background of household head.

- Illiterate
- Adult literacy
- for grade completed (write the exact figure)

II. General Information

7. How many livestock do you have ?

8. Do you have your own land? 1. Yes 2. No

9. If yes, the size in hectares

9.1. Farm land----------

9.2. Grazing land----------

9.3. Homestead----------

10. What is the nature of land form is in your area?

1. Flat land
2. Gentle slope
3. Moderately sloping
4. Steep slope

11. Which kinds of agricultural practice and input you use on your farm plot to sustainable manage the land resources?

1. Fertilizer (organic or chemical)
2. Improved seeds
3. Pesticides and insecticides
4. Irrigation, water

12. Do you participate on land management practices in your area?

1. Yes 2. No

13. If answer for question 12 is yes, which SWC measure you use?(More than one answer is possible)

Items	Ranks (123…)
Crop rotation	
Adding plant residue	
Drainage ditches	
Strip cultivation	
Fallowing	
Contour farming	
Stone/ Soil Bund	
Check dam	
Cut of drain	

15. What are the determinant factors of land management practices in your area?

1. Topography
2. Vegetation
3. Purpose of land use
4. Lack of awareness

16. Do you know about the practices of land management in your area?

1. Yes 2.no

17. What is the crucial problem of land management practices in your area?

1. Lack of awareness
2. Shortage of arable land
3. Improved technology
4. Unemployment

18. Do have access of agricultural extension services that enable to bring sustainable land management in your area?

1. Yes 2. No

19. What you think about the solution of problem in current and future in your area?_____

_____

20. Which one of is the dominant practice of land management in your area?

1. Terracing
2. Farming system

21. Are there any other modern practices of land management in your area?

1. Yes 2. No

22. Generally what is your opinion on land management practices? And do you have suggestion for sustainable land management in your area?

_____

_____

_____

_____

_____

23. What facilities and supports that you need from government and other body to manage your farmland?

_____

_____

_____

Appendix II: Questionnaires for Focused Group Discussions

1. Is there land management and how it takes place in your Peasant Associations (PA)'?
2. What are the determinant factors of land management in Peasant Associations'?
3. What are the most influential determinant factors of land management in Peasant Associations'?
4. If there are problems of land management in your area, what are the indicators for the problems?
5. What problems you encountered in relation to land management practices?
6. What would your suggestion to improve and promote and sustain land management in effective manner in your Peasant Associations'?
7. What are the practices of land management?
8. What are the best practices in your peasant Associations'?
9. What are the problems of current trends in your peasant Associations?
10. What measures to be suggested for sustaining the best practices?

Appendix III: Questionnaires for Key Informant Interview

1. What is land management?
2. What are the determinant factors of land management?
3. What are the most influential determinant factors of land management?
4. What do you think about the benefit obtained from land management?
5. What is the trend of land management through time?
6. How did you evaluate trends of land management carried out in the past and present?
7. What are the best practices of land management currently?
8. What measures do you suggest for current and future practices of land management to be sustained?