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ADDIS ABABA UNIVERSITY
COLLEGE OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

THE CHALLENGES AND PROSPECTS OF LAND RESTORATION
PRACTICES: THE CASE OF MISIRAK BADAWACHO WOREDA OF
HADIYA ZONE, SNNPR, ETHIOPIA.

BY
ADDISE ERMIAS

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Acronyms

ADB.	Africa Development Bank
ADLI	Agriculture Development Led Industrialization
CSA	Central Statistics Authority
DA	Development Agency
FTC	Farmers Training Center
FHH	Female House Hold
HZCBD	Hadiya Zone Capacity Building Department
MoARD	Ministry of Agriculture and Rural Development
MHH	Male House Hold
NGO	Non- Governmental Organization
PSNP	Productive Safety- Net Programme.
PL480	Public Law 480 means food for peace programme.
SLMP	Sustainable Land Management Programs
SNNPRS	Southern Nations and Nationalities People's Regional State
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nation Development Programme
WFP	World Food Programme.
WOE	Woreda Office of Education
WARDO	Woreda Agriculture and Rural Development Office.
WHO	Woreda Health Office

Abstract

Land degradation is nowadays threatening millions of people in the world particularly in developing countries affecting all spheres of social, economic and political life of the population. It is one of the major challenges in the country's (Ethiopia) agricultural development and food security. In order to solve the problem of land degradation, a lot of efforts have been made since 1970s in conservation practices. However, these conservation techniques have not been sustainably implemented. Thus, identification of challenges in relation to land restoration practices is of paramount importance. This study was undertaken in Misirak Badawacho Woreda of Hadiya Zone, in SNNPR. In order to achieve the objective of the study, both primary and secondary data were generated by employing qualitative and quantitative approaches. Stratified sampling technique was used to select MHH and FHH. To this effect 117 household heads were selected from two kebeles by using systematic random sampling, as it is assumed that the households are similar with respect to the characteristics that influence the research output. The process of analysis and interpretation was carried out using qualitative description and quantitative analysis. The quantitative data was analyzed using frequency, percentage and mean when appropriate. The findings of the study indicated that decrease in productivity of farm land, involvement in off-farm activities, increase in size of human population, lack of full cooperation of family members to engage in land restoration practices, low assistance gained from neighbor-hoods, less access to extension services and inadequate attention from Woreda Agriculture and Rural Development Office are the major challenges limiting the implementation of land restoration practices in effective way in the study area. Moreover, awareness creation and persistent training, introducing voluntary resettlement program, creating opportunities for alternative means of livelihood and promoting NGOs effort to participant in land rehabilitation practices to help address in the study area.

CHAPTER ONE

Introduction

1.1 Background of the study

In the 21st century, the world is facing serious problem of sustainable use of natural resources. Despite the emerging recognition of their decisiveness for the survival of humanity on the planet, these days, water, land and ecosystems are being degraded at an alarming rate (Eswaren, 1993: Fisum, 2002: Teketel, 2009). The case is worse in developing countries, where the majority of the population depends on these resources for their livelihoods. Hence, the conservation and management of land and water resources for sustainable growth in agricultural productivity and poverty reduction in developing countries 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 are said to of vital importance.

A Land resource 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 a decisive factor in addition to other technological inputs. However, land is losing its productivity due to a rising trend of land degradation (Woldeamlak, 2003). Land resources degradation resulting from different causes is threatening long-term productivity. Nowadays, land degradation is reducing yield significantly and it is more acute severe in some parts of the world than the others. For example in Central America, 75% of cropland is seriously degraded, while in Africa 20% of the total land area is at risk of being unrecovered (FAO, 1986: Sida, 2007). Land degradation in Ethiopia has become a serious problem affecting all spheres of social,

economic and political life of the population. It is one of the major challenges to agricultural development and food security of the country. The rate of the country's land degradation is very high. A large portion of the agricultural land, which is mainly located in the highland part of the country, is affected by severe land degradation (Kruger,*et al* 1997: Habtamu, 2006). On the other hand, like many other developing countries, Ethiopia is characterized by agrarian economy and about 84 % of its total population derives means of survival from agricultural activities. Moreover, the role of agriculture in the overall economy is quite significant. It contributes about 50% of the total GDP and 85% of foreign exchange earnings (Zewdie, 1999).

Thus, land productivity is one of the key elements for enhancing economic development of the country. In contrast, the level of land degradation has already reached an alarming stage (MoARD, 2007: WB, 2007: Desta, 2009). This land degradation has been recognized to be one of the chronic problems in Ethiopia and a lot of efforts have been made against problem of land degradation. However, the problem of land degradation is continuing and natural resource base is deteriorating at alarming rate (Yohannes, 1999: Genene, 2006).

The major causes of land degradation in Ethiopian high lands include set up of topography, soil types and agro-ecological parameters play a significant role in degrading the land. The root cause that accounts to this problem encompasses of soil erosion, deforestation and overgrazing are moreover, the pattern of human settlements, land tenure system and population pressure accelerated land degradation in many areas (Hurni, 1986). Therefore, Misirak Badawacho Woreda is one of the most densely populated highland areas in Ethiopia. The population density of the area is 453 persons per square kilometer. Population pressure is the main triggering factor for land degradation problem in the study area. Understanding the status and causes of land degradation is very important because it indicates the future trend. In the study area, there are programs introduced by local NGOs to restoration degraded lands starting from 2007 in addition to government efforts. Therefore, this study is going to assess challenges and prospects of land restoration practices in Misirak Badawacho Woreda.

1.2 Statement of the problem

Land degradation is one of the most serious problems in the developing countries with its having variety of different effects. The decreased agricultural productivity, gradual decline of soil fertility, and vegetation cover are the major consequences of land degradation. As mentioned in Blay,*et al* 2004 land degradation is one of the biggest problems in sub-Saharan Africa, threatening the lives of millions of people (Blay, *et al* 2004). The author outlined the main consequences of land degradation which impact negatively on human livelihoods and the environment as shortages of fire wood. Scarcity of timber products, increased sediment deposits, flooding and landslides, drying up of springs and water bodies, siltation of dams, increasing incidence of water- borne diseases, loss of biodiversity, climate change and desertification.

Deforestation and land degradation in Ethiopia, however, are impairing the forests and the land to contribute to food security and to provide other profits such as fuel wood and fodder (Badege, 2001). As Badege pointed out, the major causes of land degradation in Ethiopia high lands includes extensive forest clearing for agricultural use, grazing field and fuel wood, fodder, construction materials and cultivation on steep slopes, erosive rainfall pattern, lack of fallowing and lack of proper conservation measures. These practices lead to hindering of restoration process.

One of those possible mechanisms to mitigate the problems that resulted from land degradation is restoration of the degraded land. In Ethiopia, restoration attempts have been carried out so far on degraded lands that are also aimed at abating the effects of poverty. Realizing the complexity of the problem government of Ethiopia prioritized the significance of environmental restoration specifically on deforested and degraded land after the 1973 and 1984/85 major famines that struck the country (Aklilu, *et al* 2007). At this stage, donors and the government have supported large efforts to promote environmental restoration in Ethiopia through on labor intensive.

Recently, government has taken the initiative to run the restoration programs on the degraded lands through integrated community participation programme. Due to the

government political structure, power and resource are decentralized and restoration programme is supposed to be integrated in development on environmental conservation.

According to the survey conducted in Hadiya zone there is considerable variation in the performance of the restoration works among different woredas. By considering the rate of afforestation, construction of terraces to protect soil erosion and other physical and biological mechanisms meant to increase productivity of land as parameters (HZCBD, 2013). There are also successes restoring and failures in the restoration efforts in the area. Successes of the restoration programme are defined by the rate of reforestation and construction of terraces on degraded land. And the failure is defined by the rate of deforestation and degree of intervention by local community members in the land under restoration scheme. However, the effect of land degradation have been prevalent in the areas since time immemorial, there have been exclusive dependence of the people for subsistence to meet their basic needs, always tension exists among efforts that tend to bring agricultural development, poverty alleviation and getting rid of population pressure.

Therefore, different researchers have done studies on land degradation in different parts of Ethiopia. These researchers have mainly focused on, soil and water conservation by government, traditional farmers' land management practices and (Yeraswork, 2000: Taffa, 2002: Aklilu, 2006)), farmers' perception on soil fertility change and on causes of land degradation (Genene, 2006: Eyasu, 2002). 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 determine the restoration of degraded lands.

In an attempt to contribute in bridging the above stated gap, the study would focus on assessing challenges and prospects of land restoration practices in Hadiya zone with specific case from Misirak Badawacho Woreda. The reason why this site is selected is that it is among the Ethiopia high lands that are facing problem of land degradation. In addition to this area, so far no study has been done on issues related to land restoration practices. To this end, the study attempted to assess such issues as challenges and prospects of land restoration practices in the study area.

1.3 Objectives of the study

1.3.1 General objective

The overall objective of this study is to assess the challenges and prospects of land restoration practices in Misirak Badawacho Woreda of Hadiya Zone, in SNNPR.

1.3.2 Specific objective

This study has attempted to:

1. Explore causes of land degradation in Misirak Badawacho Woreda.
2. Investigate the roles and interest of local community in the restoration of degraded areas in Misirak Badawacho Woreda.
3. Identify the social, economic and institutional factors that determine the practices of land restoration in Misirak Badawacho Woreda.
4. Examine short coming in under taking different land restoration practices in Misirak Badawacho Woreda.

1.4 Research questions

This study tried to seek an answer for the following questions:-

1. What are the main causes of land degradation in the Misirak Badawacho Woreda?
2. What resource management methods are practiced in the degraded area of Misirak Badawacho Woreda?
3. What are the major socio-economic and institutional factors that affect the practice of land restoration in the study area?
4. What are the major short comings in under taking different land restoration practices in Misirak Badawacho Woreda?

1.5 Significance of the study

The agricultural sector is given particular emphasis for the overall future transformation of the national economy. One of the factors for its success is sustainable utilization of the

land resources. Thus, the current trend of land degradation is a threat to the viability of the country. The need for the use of various conservation strategy is, hence, very important.

Despite recent moves in Ethiopia to restoration practices in degraded area, researches done on this are still quite inadequate. Accordingly, study pertaining to assess the challenges and prospects of land restoration practices are significant. This study makes contribution along this line. An underlying basis of the study is that there is insufficient empirical and local scale understanding of land degradation and land users' conservation behavior, leading to providing only partial solutions and subsequent failures. By identifying factors affecting farmers land conservation decision making process, the result of the study as well as wider relevance in the formulation of land resource management policy.

1.6 Scope of the study

This research work was conducted only in one Woreda out of the ten Woreda and one town administration of Hadiya Zone, in SNNPR, Ethiopia. Studying some specific area is of a great important for thorough investigation.

1.7 Limitation of the study

In order to investigate the problem attempts were made to look in to land restoration practices in the study area. Any research under taking faces certain limitations. Similarly, this research is not free from such limitations mainly caused by budget and time constraints. As the study stressed on two kebeles as it is difficult to generalize the results to the entire woreda. The above mentioned problem is not only limited to the study area, but the whole country. Even though, it is difficult to examine all area.

1.8 Organization of the thesis

This thesis is divided in to six chapters. In first chapter introduction of the paper is presented. This section covers background of the study, statement of the problem, objective of study, research questions, and significance of the study, scope and limitation of the research. Chapter two represents review of related literature, which encompasses definition of concepts, empirical literature related to land degradation and restoration practices and analytical frame work. Chapter three describes the research methodology,

employed to collect relevant data and how under collected data are analyzed. At the study chapter four provides the description of the study area. In chapter five the results and discussion are presented and finally chapter six provides, the conclusion and recommendation based on the results of the findings.

CHAPTER TWO

Review of related literature

This chapter categorized in to three parts. The first part deals with definition of concepts. The second part provides an account of the empirical literature related to land degradation and restoration practices. The third part provides analytical framework adopted for the purpose of this study.

2.1 Definition of concepts

2.1.1 Land degradation

Land Degradation has no single universally accepted definition (Blaikie and Brookfield, 1987). It is a broad concept and defined by different people in different ways. UNEP,(2009) defined land degradation as a reduction of resource potential by one or a combination of processes including water and wind erosion sodification acting on the land. Similarly, World Commission on Environment and Development (WCED, 1987, Taffa, 2002) defined land degradation as “the loss of utility or potential utility or the reduction, loss or change of features or organisms which cannot be replaced. Young, (1998) and Hussien, (2006) gave a more similar definition of land degradation as the process that causes temporary or permanent lowering of current or future productive capacity of land. Alemneh, *et al* (1997) also defined the concept of land degradation as the degradation of soil, water, climate, and fauna and flora. In all of the above definitions, the common denominator is that land degradation is actual or potential reduction in the productive potential of land. Almost all countries, rich or poor; arid or humid; cool or tropical experience some form of land degradation. But the rate of land degradation significantly varies among different countries based on variation in their biophysical, social and economic structure (WCED, 1987: Taffa, 2002). For this study, land degradation is loss of soil fertility or substantial decreasing of land productivity due to soil erosion, deforestation and degradation of grazing lands.

2.1.2 Land restoration

Land restoration is process of rehabilitating the land in a given area to some degree of its former state. It is a re-engineering process that attempts to rehabilitate an area of land back to its natural state after it has been damaged as a result of some sort of disruption. In this study, land restoration implies regeneration of degraded lands through structural and biological strategies. Land restoration practices in the context of this study refers to the practices that people in the study area modern environmental conserve forest, soil and water resources and through the knowledge that they acquire through education that could be from agricultural experts. It also indicates the activities carried out by local community to restoration degraded areas. Conservation is applied maintain enhance and wise manage or reduce resource depletion. The conservation of natural resources improves livelihoods productivity of production (Clark, 1985: Desta, 2009).

2.1.3 Land tenure

Land tenure is the relationship between people, as individuals or groups with respect to land (FAO, 2002: Teketel, 2009). Explaining the critical importance of land tenure in relation to the management of land and land-based resource, (Yeraswork, 2002) put it as follows: Land tenure is critical for the emergence of viable local level collective land management. A land tenure system, which clearly defines enforceable rights, empowers land users. As an institution land tenure not only governs access to and control over land and land based resources and the flow of the benefits there of, but also it is a source of expectations, a basis for actors to stimulate and predict one another's behavior in the sphere of activity to which the regime applies, thus the fundamental nature of the role it plays in society can hardly be overstated (Mirgisa, 1994). The meaning of the term 'land tenure' in this study refers to the body rules governing the terms and conditions under which land including its resources are owned, utilized, managed and disposed(Belay,2002).

2.2 Empirical Literature

2.2.1. Ethiopian highlands: A General Overview

The highlands of Ethiopia are areas of over 1500 meter above sea level, which make up about 45% of the total land area, support over 84% of human population and two-thirds of animal population. They are also the sources of many of the country's major resources (Alemneh, 2003). Different studies have revealed that there is a wide spread belief that the Ethiopian highlands used to have an adequate fauna and flora, dependable soils, and climatic conditions. In the course of time, however, the highlands have become the most degraded area in Africa if not in the world (Terefe, 2003: Markos,1997) also underlined that the areas of rain-fed agriculture most under pressure from ecological degradation in the Horn of Africa lie in the northern and central highlands of Ethiopia. As to the magnitude of the severity of erosion, 50% of the highlands are significantly eroded, while 25% is seriously eroded (Hurni, 1983: Blaikie, 1985: Alemneh, 2003). In general, the extent of land resources degradation in Ethiopia, especially the degree of soil erosion, nutrient depletion and deforestation in highland areas of the country is very high. A significant amount of arable land in the highlands of the country is lost due to land degradation, which has different causes behind it (Lakew, *et al* 2000). Due to high degree of degradation, important renewable natural resources such as soil, water, forest and of biodiversity are highly deteriorating in the Ethiopian highlands. This problem is further aggravated by the expansion of agriculture to marginal areas (Gete, 2002). Land degradation particularly soil degradation has significant negative impact on productivity of land because soil degradation and soil productivity are inversely related. That is, where degradation is taking place at a higher rate, the productivity is low and vice versa, other things remain the same. It is manifested by a reduction in the actual or potential productivity of soils. This productivity of soil is significantly affected in Ethiopia due to the serious soil degradation in the country (MOPED 1994: Desta 2009). It is indicated that the soil in cropping land of Ethiopia is not sufficiently fertile to support the required level of food production.

2.2.2. Causes of land degradation in Ethiopia

The causes of land degradation in Ethiopia are complex and diverse. It is the result of complex interaction between physical, chemical, biological, socio-economic and political issues of local, national or global nature. Among the cause of land degradation, some are population growth, expansion of agriculture to forests and marginal lands, poverty, land tenure and government policy, political instability, land administration, overgrazing, inappropriate agriculture, and large scale expansion of irrigated agriculture (Taffa, 2002: Gete, 2002: Betru, 2003: Aklilu, 2006).

1 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.

1.1 Population pressure

An increasing rate of population growth is among the major causes of land degradation in Ethiopia. Because the increasing population leads to the requirement of more agricultural production which requires more land with the existing technological level. Getting new agricultural land is not a simple task and it can result in the expansion of farming activities to erosion prone marginal areas, deforestation, a decrease of 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 cultivated. Thus accelerates rate of soil erosion (Betru, 2003). The country has lost its forest resources, mainly due to population pressure. Different scholar indicated the declining trend of forest cover in Ethiopia through time. Brieten,(1961) and Hussien, (2006) estimated that about 37% of the total area of the country was covered by forest. UNDP, (1984), FAO,(1984) and MOA, (1984) estimated that at the beginning of 20th 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 20th 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; Hussien, (2006) and Badeg,(2003) also estimated deforestation rate of natural forest at 160,000 - 200,000 hectares per annum. The increasing population, which leads to increasing demand for more agricultural land, fuel wood, construction material and other forest products, is the major cause 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. This further exacerbates the problem of environmental degradation (Badeg, *et al* 2003; Hussien, 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 (Pender, 1998; Desta, 2009).

1.2 Poverty

Poverty and natural resource degradation are negatively reinforcing. As a result land is prone to degradation decline of agricultural productivity is resulting in decreasing incomes and food security. This in turn leads the deepening of poverty (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 available resources. There is intensified pressure on the natural resources. As a result, deforestation, burning of dung and crop residues are 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 and fuel saving stove 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).

1.3 Land tenure

Several aspects of land tenure arrangements influence farmers' decisions to land management. 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 production that they can from the land, even if the 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 invest, 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 important is and respect of the right of an individual or well-defined group to continue to use a given piece of land under communal or private tenure. Communal tenure may undermine incentives to manage land in a sustainable manner. 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 Natural factors

In addition to socio economic and institutional factors, there are also natural factors that are contributing to land degradation in Ethiopia. The most important one are slope and high intensity of rainfall. Steep slope is among the major natural causes for land degradation in the country. Rain with high intensity on bare, unprotected soil is also resulting in erosion by water in the Ethiopian highlands (Lakew 2000). The erosive capacity of rainfall is a function of its intensity and distribution. Intense tropical storm, which is unevenly distributed only with in the months of June to September is the major cause of erosion in most highlands of the country. The erodibility of soil, which is a function of its intrinsic properties such as texture, structure, organic matter content and, degree of vegetation cover are other determining factors for loss of soil through run-off. Mountains and undulating terrain characterize relief in most highlands of Ethiopia, this coupled with poor physical and chemical properties of some soils make the highlands erosion prone (Lakew, *et al* 2000).

2.2.3 Consequence of land degradation in Ethiopia

In general, the global extent of arable land and grazing land continues to decline due to degradation emanating from urbanization, unsustainable agricultural practices and deforestation. Moreover, a significant portion of the remaining arable and grazing land is under considerable pressure due to compaction of livestock and farm implements,

salinization, alkalization or acidification, depletion of nutrients, water and wind erosion and deterioration of drainage. Especially, sub Saharan Africa where Ethiopia is found is facing serious environment and development problem (Taffa, 2002).

In Ethiopia, the issue of land degradation is so vital since the livelihood of the biggest portion of the country's population and the overall economy of the country depend on agriculture. Land degradation is seriously affecting agricultural production and food security of the country's population. Nowadays, it is becoming one of the most important problems of food security in the country (Aklilu, 2006). This is for the reason that, the high degree of land degradation in Ethiopia, especially the degradation in the form of soil erosion is one of the major environmental problems that have negatively affected the performance of agricultural sector as the overall economy. Accordingly, the livelihood of Ethiopian population is threatened by the increasing trend of land degradation (Aklilu, 2006; Habtamu, 2006). The impact of land degradation on Ethiopia's agricultural economy is very large. Ethiopia is losing 30,000 hectares of land on annual basis due to degradation and so far more than 2 million hectares have already been severally damaged (WB, 2007b). The country is losing a significant volume of soil every year due to soil erosion. The annual loss of soil in highlands of Ethiopia was estimated to range from 20 to 100 tons/hectare per year which leads to an annual productivity loss on cropland of 0.1% to 2% of total production for the country (Lakew, *et al* 2000). In general, the agricultural economy of the country is highly threatened by land degradation induced by specifically accelerated soil erosion.

2.2.4 Land restoration practices in Ethiopia

Traditionally through time, farmers have developed different soil conservation and land management practices. With those practices, the farmers are able to sustain their production for centuries. Until now, those technologies are playing a significant role in the production of subsistence agriculture. Among the traditional land management techniques that have been practiced by Ethiopian farmers, the major ones include ploughing of narrow ditches on sloping fields to control run-off, farmland terraces, traditional ditches and furrows, contour ploughing, fallowing, crop rotation, farmyard manure and agro-forestry (Betru,2003).

Large-scale efforts for implementing natural resource conservation and development programs had taken place to reverse the problem of land degradation in Ethiopia starting from the 1970s. The programs mainly focused on soil and water conservation and restoration of degraded land through building physical structures and afforestation measures (Alemneh, 2003; Woldamlak, 2003; Aklilu, 2006; Alemayehu, 2006). These projects were supported by food aid and the first food for work-programme to supported soil and water conservation activities carried in Ethiopia in 1971. Next in 1972, it was started in Wello; these activities were supported by U.S. food under PL 480(public law 480 means food for peace programme) projects to carry out afforestation, and construction of low cost rural roads and small water projects. Then it was replaced by food for work projects that were funded by World Food Program (WFP) in 1974, commenced primarily due to drought and famine of 1973/74. The main activities under those projects were reforestation and soil and water conservation in the drought prone areas of the country (Betru, 2003).

Then after the relatively small-scale and fragmented food for work projects of WFP were consolidated in 1980 under one support known as restoration of forest, grazing and agricultural lands. That project marked the beginning of large-scale soil and water conservation program in Ethiopia. Starting from that time, watershed or catchments approach became the strategy of government. That has been government's conservation strategy for about one and a half decades. The major elements of the soil conservation activities were a range of physical structures such as farmland and hillside terracing, cut-off drains and waterways, micro-basins, check dams, water harvesting, structure like pond and farm dams, spring development, reforestation, area closure and management and gully restoration. At the beginning it was carried out in 19 catchments, nevertheless by 1990, it was scaled up to 117 catchments with a total area of 3.5 million hectares (Betru, 2003).

However, it is widely recognized that the projects had little success in meeting their objectives, and land degradation has continued to be the most serious environmental problem especially in the highland Ethiopia. Among others, the top-down nature of conservation approaches in the development and transfer of technologies considerably contributes to the ineffectiveness of the strategies and the failure of the projects (Almneh, 2003; Woldamlak, 2003; Aklilu 2006). Moreover, various socio-economic, cultural and

political constraints, improper planning, inadequate resource allocation and recurrent drought were also known to dilute much of the efforts (Yeraswork, 2000; Woldamlak, 2003; Alemneh, 2003) Alemayehu, (2006) in his part identified the following four major shortcomings of these large- scale soil conservation efforts of the 1970s and 80s. First, these structural conservation measures were found to be costly. Second, farmers were reluctant to adopt such labor-intensive measures. Third there was little systematic effort made to incorporate indigenous soil and water conservation techniques and the loss of farm land from conservation was not considered. Finally there was no obvious relationship between these large investments on land restoration on one hand and improvement in the food security and income of farmers on the other” (Alemneh 2003).

The efforts to tackle the problem of land degradation starting from the 1970s have been significant. The largest of all the efforts was the one that has been undertaken between 1976 and 1988 with WFD support. During that period, 800,000 km of soil and stone bunds and 600,000 km of terraces were installed. Moreover, 500 million tree seedlings were planted, 100,000 hectare of degraded lands were closed for natural regeneration and check dams were constructed along gullies of tens of thousands of kilometers long (Eyasu,2002: Woldeamlak, 2003). These conservation and restoration works were undertaken only on 7% of the total land area that needs treatment. With the same rate it was estimated that treating all the remaining degraded lands could take seven decades (Woldeamlak, 2003). Moreover, the achievements of the intervention were at the end evaluated to be ineffective, insufficient and unsustainable (Woldeamlak, 2003).

2.2.5 Determinants to land restoration practices

1 Economic factor

Farmers will adopt soil conservation practices if they have the necessary labor, capital and technological inputs and if they perceive an immediate economic benefit (Morgan, 1996). Individuals with few current incomes and inability to obtain capital for conservation investments may not be willing to maximize expected net returns over a long period. Similarly, individuals in uncertain economic situations will be inclined to use short planning horizons because they are unable to predict future costs and prices (Ervin and

Ervin, 1982). As poor farmers generally possess less land, they are more often engaged in off farm activities such as petty trade. This can decrease their interest to invest on soil conservation practices. According to Hagos *et al* (1999) small farm holdings and land fragmentation may undermine farmers' interest in undertaking some kind of land improvement. In addition, investment that can be easily damaged by free ranging livestock or subject to theft such as trees are less likely to be made far from the household where it is difficult to protect.

2 Institutional policy supports

Appropriate policy environment is the pre requisite to implement natural resource management processes that satisfy the specified objectives. Government policies are not translated into action unless there is the political will to implement 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, the chance punishment for illegal encroachment rise on reserved land. The restriction of land was often to preserve the income or power of the ruling elites.

3 Socio-cultural factors

In the past, there was enough land for everyone to bring more land into use. However, at present 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 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; 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 greatly deal from one country to another. In areas 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. However total effect of these combined factors is unnecessary

The previous efforts did not bring significant positive impact in improving the land degradation due to different factors. The adopted analytical framework (Figure 1) indicates that land restoration practices are determined by socio-cultural, economic, and institutional /policy and environmental factors. This research is, therefore, conducted on the ground of these empirical evidences to investigate major challenges affecting land restoration practices in Misirak Badawacho woreda, Hadiya Zone of SNNPR in Ethiopia.

2.2.6 The analytical framework

As it is stated in section 2.2.5, there are different factors that could affect land restoration practices. These factors are interlinked with one another and operating at different scales. Among these factors, some have direct influence on land restoration practices while others have indirect influence. The analytical framework illustrated in Figure 2.1 is adopted for this research. It is adopted since it comprehensively shows the factors that are determining land restoration practices. It indicates that land restoration practices are affected by socio-cultural, economic, policy/institutional support and environmental factors. The socio-cultural factors include population pressure, motives of family members' assistance from outside, and participation of youth. The economic factors include, farm productivity,

involvement in off farm activities and availability and access to labor outside family. The policy/institutional support related factors include access to extension services, access to credit, efforts of government and NGOs. Similarly, the environmental factors include topography, climate, soil and vegetation cover and types. The framework generally indicates how the factors are complex and how they affect the practice of land restoration in a given area.

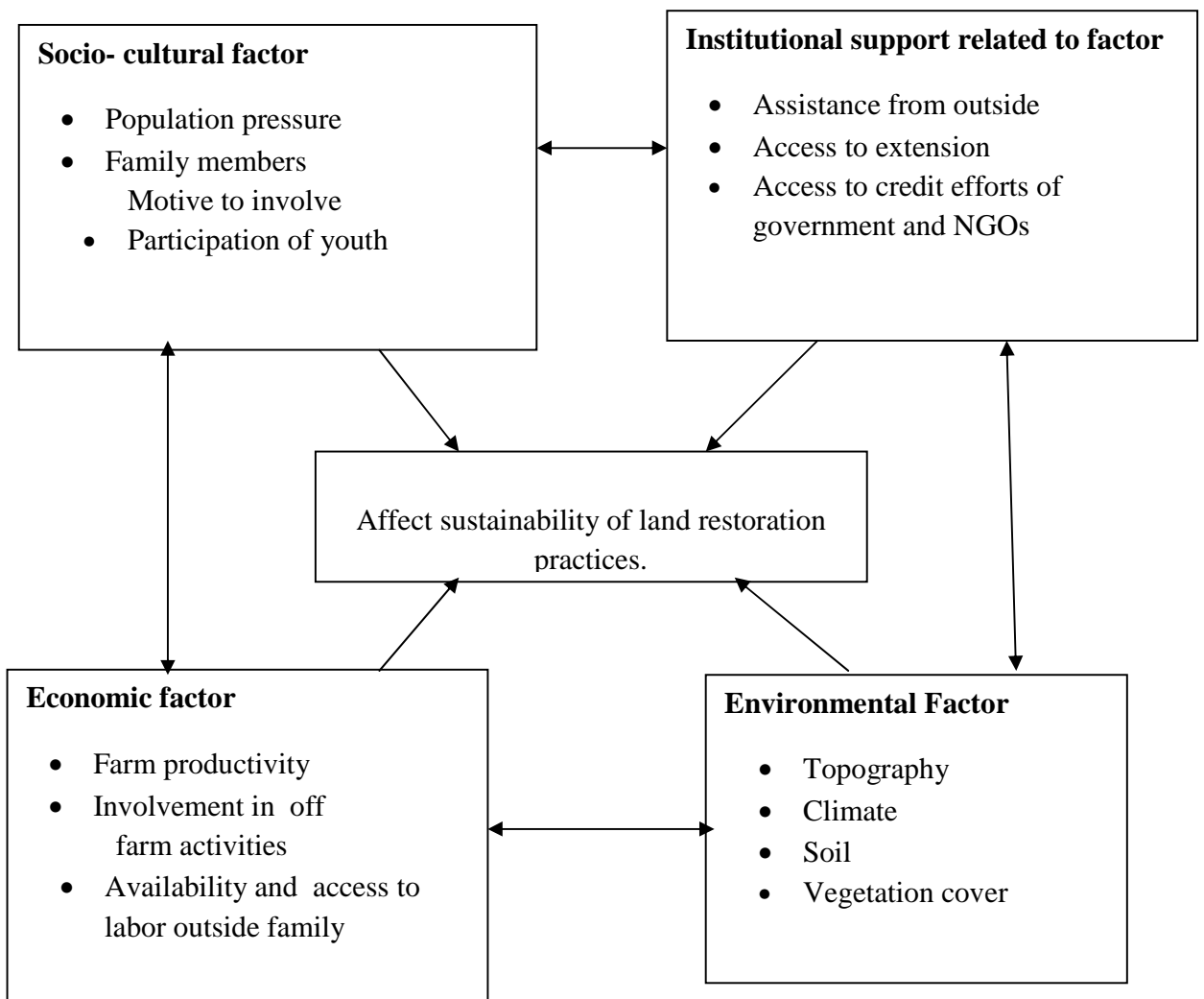


Figure 2.1: Analytical framework for factors challenging land restoration practices.

Source: Modified from Hudson, 1986 and Troe, *et al* 1999.

CHAPTER THREE

Research Methodology

3.1 Selection of the study site

According to Agriculture and rural development of Misirak Badawacho Woreda report of 2013, Misirak Badawacho Woreda is divided in to two agro-ecological zones. These are moist weinadega and dry woinadega. According to the above mentioned report, the woreda is divided in to 1 urban and 38 rural kebeles. Therefore, the researcher has selected only 2 rural kebeles namely Amiburise Anijulo and Tikare Anibassa from dry weina daga by purposively technique, out of 39 based on restoration practices intervention by local NGOs in addition to government efforts to restoration degraded lands.

3.2 Sampling technique

The study sites have a total of 1175 households out of which 650 are inhabitants of Amiburise Anijulo, while the rest 525 resides in Tikare Anibassa. Stratified sampling technique was used to select male-headed households and female-headed households. After categorization of households in to male-headed and female-headed, 117 households (10% each kebeles 65 from Amiburise Anijulo and 52 from Tikare Anibassa) were selected as sample size based on principle of proportionality to size. After this decision, 104 male headed households (57 from Amiburise Anijulo and 47 from Tikare Anibassa) and 13 female headed households (8 from Amiburise Anijulo and 5 from Tikare Anibassa) were selected by using systematic random sampling as it is believed that the households are similar with respect to the characteristics that influence the research output.

Table 3.1 Indicates the sampled kebeles and total size of households' heads that were included in the sample.

Name of sample kebeles	Total number of household heads by sex			Number of sample households					
	MHH	FHH	Total	MHH		FHH		Total	
				Number	%	Number	%	Number	%
Amiburise Anijulo	570	80	650	57	54.8	8	61.5	65	55.6
Tikare Anibassa	471	54	525	47	45.2	5	38.5	52	44.4
Total	1041	134	1175	104	100	13	100	117	100

Source: field survey, January 2014. **MHH:** male households. **FHH:** female households.

3.3 Source of data

The relevant data used to meet this study were obtained from both primary and secondary sources. The primary data were acquired from individual households' heads farmers. To upgrade the reliability of the primary data; secondary sources were also gathered from office document reference.

3.4 Data collection instruments

The following instruments were employed to generate the primary data.

3.4.1 Household survey

Structured survey questionnaire was used to obtain information from selected samples of 117 households from two kebeles. In this survey, households demographic characteristics, household socio-economic characteristics, issues related to land degradation, land restoration practices and the existing challenges to restoration degraded lands and measures to be taken to improve land restoration practice were obtained. In order to conduct the household survey, seven enumerators (4 from Amiburise Anijulo and 3 from

Tikare Anibassa) were assigned in the data collection process. Data collectors were composed of teachers and development agents who have education background of Diploma and they were oriented by the researcher before launching the survey to make them understand the purpose of the survey and to familiarize them with the questionnaire.

3.4.2 Key informant interviews

A key informant interview is particularly important in getting information pertinent to land restoration practices. Through such instrument, information regarding the views of experts from Woreda Agriculture and Rural Development Office, Officials of Non-Governmental Organizations working on environmental conservation, Development Agents Kebeles Administrators and community elders of the respective sample kebeles was collected.

3.4.3 Focus group discussion

The focus group discussion was used as one critical source of primary data in addition to the household surveys. Two focus group discussions were conducted in the two selected kebeles. For the focus group discussions, checklist and interview guide were prepared and people, with different socio- economic background are included in the discussion.



Fig 3.1 Focus group discussions in Tikare Anibassa study area. Source: field surveys (January 2014).

The people included in the discussion include local elders, poor women and men, youth and adult men and women. There was no classification of the participants in to different groups because land restoration practice is the issue of the whole people. Data collected through focus group discussions include problems of land degradation, land restoration practices by society, challenges of land restoration practices, measures to be taken to sustain the practices and related issues.

3.4.4 Field observation

Direct personal observation encompassed visit of cultivated and uncultivated land, topography, vegetation cover, settlement pattern and the overall aspects of land restoration practices of the study area. Thus the researcher's opinion based on his visit of the study area was included in the analysis.

3.5 Method of data analysis

Data that were available through different instruments were analyzed using quantitative and qualitative techniques. Statistical Package for Social Scientists (SPSS) software was employed to analyze data drawn from household survey. Descriptive statistics like mean, percentage and frequency distribution were used to analyze quantitative data. Qualitative data generated from key informant interview, focus group discussion, personal field observation and secondary sources was analyzed by narrative description.

Reviews of Secondary sources identified by other scholars, researchers have been established in the review of Literature. The tendency of misinterpretation, exaggeration of restoration results and the processes of restoration that was noticed during the field work have been settled through triangulation of information and careful interpretation of data.

CHAPTER FOUR

4. The Description of the Study Area.

4.1 Physical conditions

The chapter provides background information about the physical background, population conditions, land use and land cover, drainage system, soil type, agricultural activities, social service and land restoration activities of Misirak Badawacho Woreda.

4.1.1 Location of the study area

Misirak Badawacho woreda is found in Hadiya Zone of SNNPR. Astronomically, it is located between $7^{\circ} 9'$ to $8^{\circ} 15'$ North latitude and $37^{\circ} 5'$ to $40^{\circ} 00'$ East longitude. The woreda is bounded by Alaba special woreda of SNNP and Siraro woreda of Oromia region to the north, Kadida Gamela woreda of Kembata Tembaro Zone and Mirab Badawacho woreda which was former part of Badawacho woreda to the east and Wolaita Zone to the South (see Fig 4.1). Woreda's capital, Shone, is situated at about 345 kms away from Addis Ababa on the asphalt road running from Shashemene to Arbaminch. The special feature in terms of location of East Badawacho is that no part is bounded with other woredas of Hadiya Zone since it is separated by the presence of Kembata and Tembaro zone between east Badawacho and other woredas of Hadya Zone.

economic enhancement of the woreda. Based on this concept the woreda has been divided in to Misrak (east) and Miriab (west) Badawacho derived from the direction east and west.

The average annual rainfall ranges from 800mm to 1500 millimeters. The rainfall is characterized by erratic and uneven distribution throughout the year. The highest rainfall occurs from the beginning of spring season to the end of autumn season (Rain season from March to October and dry season from November to February). The rainfall reaches its peak in the month of August. Extreme fluctuation in rainfall, both in its annual totals and the distribution throughout the year, are the primary constraints for agriculture particularly under rain fed conditions. That means within the woreda, in each of the cropping seasons the rain usually either begins lately or quits very early before the crops get mature. On the contrary, unusual and intense heavy rains cause serious damage leaving no chance for farmers to salvage the losses. The mean annual temperature of the area ranges from 17.6⁰ to 22.6⁰ C (WARDO 2013).

Table 4.1 Average temperature and rain fall of Misirak Badawacho Woreda.

Months	J	F	M	A	M	J	J	A	S	O	N	D
Tempera ture (°C)	20.1	21. 5	21.3	20.5	18.8	19.8	17. 9	18.6	19. 6	19. 8	20. 7	20. 4
Rainfall (mm)	29.6	17. 5	121. 0	118. 5	114. 2	120. 1	82. 2	129. 1	89. 9	42. 4	20. 8	58. 7

Source: National Meteorology Agency, South Zone Hosanna, February 2014.

4.1.3 Land-use/ land cover

The study area has an old history of land use with high degradation, associated with especially increasing human population. As the remnant scattered of tree species depict, the area has been once covered by dense forest. However, the vegetation cover has been removed, and replaced by cultivation fields, grazing land and plantation of exotic species such as Eucalyptus globules and E camaldulensus. As per the trend analysis of forest coverage by watershed management experts, particularly in Misirak Badawacho moist weina dega agro-ecological zone, forest covered area was 55% before 1974. Between

1974 and 1991, the forest coverage declined to 32% and rapidly went down to 15% between 1991 and 2008 mainly due to the population growth and expansion of cultivation land. Thus, like other parts of the country, natural vegetation of the area has been influenced by human activities (WARDO 2013).

The remnant tree species in the study area witness the dynamics of the land cover/ land use due to the impact of human activities. Like the forestlands, grassland area and bush lands area overgrazed and then gradually changed into farmland. Common grazing land exists in pocket areas and farmers graze their animals near to homestead. Because of this shortage of grazing field, farmers have owned small numbers of animals. As result, accelerated land degradation and soil fertility decline become the main problem of the area on following the land use/ land cover change.

4.1.4 Drainage system of Misirak Badawacho Woreda

In assuring food security and poverty reduction property, using drainage basins play a pivot role. Parts of Hadiya zone and most parts of Misirak Badawacho area are drained by Bilate River. Bilate River crosses north south direction which bisects Misirak Badawacho into two parts and reaches Lake Abaya. According to Agriculture and Rural development office report of the woreda (2014), about 92% of the woreda is drained by the Bilate River (WARDO 2013). In addition to Bilate River, Bisanguracha River also covers some part of the woreda. Though, these rivers are permanently flowing with lesser volume of water during the drier months. There is no attempt to use river water to reduce chronic food insecurity particularly in the moist weina dega parts of the woreda. The precious top soils are highly eroded and contributing for the increasing silt deposits in Lake Abaya (WARDO 2013).

4.1.5 Soils type

It is understood that the type of a given soil is a function of the interplay of a variety of factors (FAO, 2006). Among other things topography, climate and vegetation cover are the major factors that determine the structure and composition of soils. According to FAO/ UNDP soil classification, the most commonly found soil types of the study area are black

basaltic soils (Vertisols) and in some parts of the woreda sandy and alluvial soils are common.

According to woreda agricultural and rural development office (WARDO) report about 90% of the woreda's soils are infertile mainly due to domination of less preferred soil types, over cultivation and limited soil conservation measures against soil erosion. These soils are found in both agro-ecological zones. Fertile soils are found only in about 10% of the land area of the woreda. This indicates that to obtain optimum crop production, either modern inorganic fertilizers or organic manure or compost need to be used. Application of modern chemical fertilizers is also very costly for the poor farmers, even more costly under erratic rainfall condition as they can simply incur costs with no adequate harvest.

4.1.6 Agricultural practiced of Misirak Badawacho Woreda

Agriculture, mainly composed of crop production and animal husbandry, is the main source of livelihood of the population in the woreda. Traditional oxen-plough and hoe-culture are practices in the area. The drier weina dega is mostly dependent on cereal crops such as maize, teff, haricot bean and sorghum are the most common agriculture products. To some extent, they also grow commercial crops like coffee while the moist agro-ecology is relatively diverse in terms of crops grown as they grow cereals, root crops like sweet potato and taro, tubers like enset, fruit trees like avocado, etc. Coffee is the main source of cash mostly for moist agro-ecology. The dry weinedega area is characterized by large land holding size compared to the moist one. However, due to scarcity of moisture and absence of irrigation activities the area is not as such productive. Thus, it is difficult to practice intensive agriculture in this area. Livestock production is important in both agro-climatic zones as one type of mixed farming.

The productivity of the major cereal and root crops vary from year to year. Moreover, when the land coverage increased in size the productivity also increased. In 2008 sweet potato was totally destroyed by the pests and drought. As the WARDO report, little effort has been made to recover the damage of the area. The crop is very crucial gap filling crop during the hunger months as sweet potato is mainly harvested between April and June in the woreda.

4.1.7 Livestock production and productivity

Ethiopia is the leading county in Africa in the size of livestock (FAO, 1995). The distribution of livestock covered high land areas where mixed farming activities held. In the low lands animal husbandry is the dominant source of income (Tedla *etal*, 1989). Misrak Badawacho is one of the central high land part of SNNP region accommodates large production of live stock. According to Woreda agricultural and rural development office (WARDO) data, milk yield of the local cow reaches 3 liters per day during the first two to three months of lactation. This is still very low compared to the world standard.

Table: 4. 2 Livestock population number of Misirak Badawacho Woreda.

No	Name	Livestock population number
1	Cattle(cow and ox)	203999
2	Sheep	12741
3	Goats	13630
4	Poultry	57460

Source: Woreda agricultural and rural development office (2013) report.

As indicated in tables, cattle population is relatively high in the woreda. However, livestock productivity is very low. According to the key informants, Zebu breeds dominate the cows and the average daily milk yield is between 1 and 1.5 litters for a maximum of 6 months of lactation. Livestock provide food such as meat, milk, cheese and non food products such as hide and skin. Indirectly livestock supplying essential nutrients inputs such as manure for replenishing soil fertility and restoring nutrients. Animals are as well used for traction and power for halving, and threshing. It is the main source of income for periods of distress time when crop failure happened due to erratic nature or seasonal drought occurred in rural areas. However, they are also victims of recurrent drought in the area.

4.2 Human conditions

4.2.1 Settlement and Population history of Misirak Badawacho Woreda

Misirak Badawacho was formerly known as Badawacho until it was divided into east and west parts. This is because East and West indicates the direction, while, Badawacho reflects the common name that represents most of the tribes living in the woreda. Thus, Misirak Badawacho has got its name after the division of the current woreda, into east and west. Recently five kebeles have been added in to the woreda from Siraro woreda of Oromia region-through referendum.

Though written documents were not available to indicate the actual time of the first settlement, current population density and settlement patterns witness that the area was settled since long ago. Some evidences assured the time span of settlement include the resettlement program of 1985 that displaced several thousands of population to the north western part of the country namely to Metekel (Part of the current Benishengul Gumuz) and (Gambela), was also the result of long resettlement history.

According to 2007 population and housing census result, the population of Misirak Badawacho was 185,305 excluding the population of 5 kebele's of Oromia. According to the woreda Finance and Economic Development Office report of 2010, the total population of the woreda including the 5 kebeles estimated to be 195,446 with almost equal proportion of male and female of which female population constitute 97, 875 and male population of 97,571.

4.2.2 Population density

Crude density may not be the real indicator of the population pressure. This is because newly included Keble's are very big in their size and have very few populations' density. This may affect the crude density that fails to describe the agriculture density of the study area. Therefore, calculating the other types of densities may give better information about population distribution in relation to resource base. These include rural population density which compares the total rural population of a certain geographical area with its total area Agricultural density that compares the total rural population of a certain geographical

area with the total cultivable land within that geographical unit. Though the carrying capacity differs from place to place depending on the land characteristics and quality, high population density indicates heavy population pressure on land resources. Whatever is the case, the woreda is among the densely populated woredas of the country with crude density of about 453 persons per square kilometers and agricultural density of about 512 persons per square kilometers. Though there is no reliable data disaggregate the calculations, population density is higher in the moist weina dega parts of the woreda than the drier weina dega, which can easily be seen from the residential houses very close to one another. As a result, scarcity of land and over cultivation are among the major causes of land degradation and chronic food insecurity particularly in the moist weina dega parts of the woreda.

4.2.3 Age and Sex ratio of the population

Population of the woreda is almost proportional in terms of male to female ratio with having 49.3 percent of male and 50.7 percent female. Age is a determinant factor that affects food security activities. The productive age population constitutes about 53.8. Most productive age populations in most developing countries/do not have job opportunities. Thus, most of the productive age populations are economically dependent. Misirak Badawacho has large proportion of young population that constitutes about 46.2 % of the total population and even, those productive age population require extra job to survive because no more job opportunities are not created to accommodate these people except competing over the existing limited arable land. As a result, significant number of youngsters seasonally migrates to the nearby towns and state farms of the rift valley areas looking for job opportunities. It is also common to see many youngsters from Badawacho area working as share croppers in the neighboring Alaba and Silte areas where the land holding is relatively better (WARDO, 2013). Besides, large numbers of households were recently resettled in areas away from their home such as Basketo and Dawro (WARDO, 2013).

4.2.4 Social services in Misirak Badawacho Woreda

4.2.4.1. Education

Current status of Misirak Badawacho Woreda in terms of educational facility it has primary and secondary levels. According to Misirak Badawacho Woreda Education Office, 48 percent of the students are composed of female. Compared to Male the participation of female both as a student and as teacher in education is lower.

Inadequate supply of textbooks and classroom furniture, lack of laboratory or inadequate supply of equipment, shortage of chemicals and lab-technicians, shortage of qualified teachers, and high dropout and repeaters characterize most of the schools in Misirak Badawacho Woreda.

4.2.4.2. Health

Health is among key indicators for a socio-economic development. According to the data obtained from WHO, no hospital is available in Misirak Badawacho. In the recent past there is only one health station at the woreda capital, Shone. But now about 5 health stations have been established at different parts of the woreda. The real access to health services is limited especially in the rural area due to several reasons, of which lack of transportation, lack of infrastructure, physical facilities, drugs and other consumable supplies are the major ones. Predominant health problems in Misirak Badawacho Woreda are communicable diseases such as malaria, intestinal parasites and malnutrition.

4.2.4.3. Ethnicity, language and religion

Hadiya is the dominant ethnic group with its distinct language and culture. The other ethnic groups living in the woreda include Amhara, kambata, wolaita, and guraghe. The main language spoken in the woreda is Hadiyagna.

In terms of religion, protestant is the dominant one of the woreda. There are also followers of orthodox and Muslim in small number.

CHAPTER FIVE

Result and Discussion

This chapter deals with the analysis of the survey data and interpretation of major findings. As already noted, structured questionnaire was administered to 117 Sample respondents in the Amiburise Anijulo and Tikare Anibassa. In addition group discussion, key informant interview and field observation was carried out. The questionnaire was designed in such way that it enables to collect data on the socio-economic characteristics of the sample households, Assessment of land degradation and socio-economic and institutional factors that affect land restoration practices were investigated in the study area.

5.1 Socio-economic characteristics of the sample households

5.1.1 Demographic characteristics

The results indicated that, the sex ratio of the sampled households selected for this study is proportional to the household head ship. Thus, 88.9% of the respondents were male households (MHHs) and 11.1% were female households (FHHs). Considering the marital status of the sampled households, 87.2% of the respondents were married. The rest of the respondents 8.5%, 1.7% and 2.6% were single, divorced and widowed respectively (Table 5.1). The age structure of the respondents, the majority (65.8%) of the respondents are between the age of 31 and 50 years old. About 17.9% of the respondents are below 30 years while 16.2% are above 51 years old. The mean age of the households is about 47.7 years. That means on average most of the households are adulthood, which could have positive implication in terms of availing and coordinating family labor. The maximum and minimum ages of the respondents are 81 and 24 years old respectively. In the study area, one can see the average size of the family. As it is indicated in Table 5.1, the majority of the sample households have large family size. Of the total, 67.5% of the respondents have a family size of five and more. The largest family size is 16 and the smallest one is 2. The average family size is about 7.57. While, considering sex composition of the household members, the average size of males and females is 3 and 4 respectively. The statistical

analysis indicates that there is no significant mean difference of sex composition in household members of sampled households' respondents.

Table 5.1 Demographic characteristics of the sampled household heads

Demographic characteristics of SHHs	Respondents				Total	
	Amiburise A.		Tikare A.		Freq.	%
	Freq.	%	Freq.	%		
Sex of SHHs						
Male	57	87.7	47	90.4	104	88.9
Female	8	12.3	5	9.6	13	11.1
Total	65	100	52	100	117	100
Age of SHHs						
<30	11	16.9	10	19.2	21	17.9
31-40	23	35.4	19	36.5	42	35.9
41-50	18	27.7	17	32.7	35	29.9
51-60	7	10.8	3	5.8	10	8.5
>60	6	9.2	3	5.8	9	7.7
Total	65	100	52	100	117	100
Marital status						
Single	4	6.2	6	11.6	10	8.5
Married	58	89.2	44	84.6	102	87.2
Separated	1	1.5	1	1.9	2	1.7
Widowed	2	3.1	1	1.9	3	2.6
Total	65	100	52	100	117	100
Family size						
1-2	16	24.6	3	5.8	19	16.2
3-4	12	18.5	7	13.5	19	16.2
5-6	3	4.6	6	11.5	9	7.7
7-8	14	21.5	17	32.7	31	26.5
>9	20	30.8	19	36.6	39	33.3
Total	65	100	52	100	117	100

Source: Field survey, January, 2014. SHHs: Sample households' heads.

5.1.2 Educational status of the sampled households

As it is indicated in Table 5.2, an effort has been made to study the educational status of the sampled household heads in the respective Kebeles. In the study area, 12.8% of the sampled household heads do not read and write. 29.1% of the respondents read and write without attending any formal education. 10.3% attended grade 1-4. The number of people attended education is decreasing as the grade level increases. The total percentage of sampled households attended grade 5-8, 9-10 and above 10 are 20.5%, 16.3% and 11% respectively. In the study area many of the samples, household heads can read and write. This, in turn, could have its own positive implication in relation to dissemination of new technologies of soil and water conservation practices that could be integrated with local practices.

Table 5.2 Educational status of sample household heads

Educational status	Respondents				Total	
	Amiburise A.		Tikare A.		Freq.	%
	Freq.	%	Freq.	%		
Illiterate	6	9.2	9	17.3	15	12.8
Can read and write	17	26.2	17	32.7	34	29.1
1-4	6	9.2	6	11.5	12	10.3
5-8	16	24.6	8	15.4	24	20.5
9-10	10	15.4	9	17.3	19	16.3
10+1	4	6.2	2	3.8	6	5.1
10+2 and above	6	9.2	1	1.9	7	5.9
Total	65	100	52	100	117	100

Source: Field Survey (January, 2014)

5.1.3 Land holding and farming system of the sample households

5.1.3.1 Land holding size

The land holding size of farmers in the study area is very small. Land is held privately, except small communal grazing and forest lands. That means every piece of land, whether cultivated or not, belongs to a particular household. As it is indicated in Table 5.3 almost all of the respondents (100%) replied that they have their own farming plot. However, there is a significant variation in the size of holding among householders. Of the sampled households, the majority (73.8%) in Amiburise Anijulo and (50%) in Tikare Anibassa hold land that is less than one hectare. About 15.4% in Amiburise Anijulo and 25% in Tikare Anibassa land hold size was between 1 and 2 hectare. 10.8 % in Amiburise Anijulo and 11.5 % Tikare Anibassa was between 3 and 4 hectare. Only 13.5% in Tikare Anibassa has more than 4 hectare. This indicates that there is acute shortage of land in the study area which deters farmers' ability to produce enough crops to feed the fast growing population. The pattern is similar to the national level reality. According to CSA (1995), some 80% of the Ethiopian farmers in the highlands (above 1500 meters) cultivate less than one hectare of farming plot. Even worse, the number of households with small holdings will increase with time owing to the increasing rural population and limited land resource.

5.1.4 Farming system

In the study area, the farmers are engaged in small scale farming using simple farming implements and methods of production. Because of the simple farming tools and methods they use and they produce very small yields. Their farming system is as subsistence farming. Table 5.3 shows main occupation, land holding size of the sampled households. Most of the household heads in the study area derive their livelihood from mixed farming (crop production and animal rearing). The numbers of respondents, who are engaged in mixed farming, are 92.3%. Insignificant number of the sampled household heads (7.7%) only produce crop.

Table 5.3 Landholding size and main occupation of the sample households.

Land holding size	Respondents				Total	
	Amiburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Yes	65	100	52	100	117	100
No	-	-	-	-	-	-
Total	65	100	52	100	117	100
Total farm land size						
<1ha	48	73.8	26	50	74	63.3
1-2 ha	10	15.4	13	25	23	19.7
3-4 ha	7	10.8	6	11.5	13	11.1
>4 ha	-	-	7	13.5	7	5.9
Total	65	100	52	100	117	100
Main occupation						
Crop production	5	7.7	4	7.7	9	7.7
Mixed farming	60	92.3	48	92.3	108	92.3
Total	65	100	52	100	117	100

Source: Field Survey (January, 2014)

5.1.5 Status of land holding to support the households' livelihood.

In the study area, respondents were asked about the status of their holding to support households' livelihood. As it has been indicated in Table 5.4, the majority of the respondents (96.9%) in Amiburise Anijulo and (96.6%) in Tikare Anibassa replied that they have no sufficient cultivated land to support their families' livelihood.

Table 5.4 Status of landholding size to support the households' livelihood and options for additional land.

Status of land holding size and option additional land	Respondents				Total	
	Amiburise A.		Tikare A.			
Status of land holding	Freq.	%	Freq.	%	Freq.	%
Insufficient	63	96.9	50	96.2	113	96.6
Sufficient	1	1.5	2	3.8	3	2.6
Excess	1	1.5	–	–	1	0.8
Option for additional land						
Yes	36	55.4	42	80.8	78	66.7
No	29	44.6	10	19.0	39	33.3
Option for additional land if “yes”						
Share cropping	28	77.8	26	61.9	54	69.3
Lease / land contract	4	11.1	10	23.8	14	17.9
Encroach forest and grazing land	4	11.1	6	14.3	10	12.8

Source: Field Survey (January, 2014)

Likewise, those respondents who indicated the insufficiency of the land holding size were asked whether they have options of getting additional land. About 44.6% of the respondents in Amiburise Anijulo and 19.2% in Tikare Anibassa have no options of getting additional land. As it is indicated in Table 5.4, 55.4% and 80.8% of the sampled households have different options to get additional land in their respective kebeles. Accordingly, 77.8% of the respondents in Amiburise Anijulo share the land for cultivation from farmers who have relatively large land size. This figure for Tikare Anibassa is 61.9%. About 11.1 % in Amiburise Anijulo and 23.8% of the respondents in Tikare Anibassa lease land for additional crop production .The rest of the respondents exert pressure on the nearby forest and grazing land to get additional land, which has great damage to the natural environment. The way of having access to additional land by clearing forests and grazing

land is small in the study area as compared to other means. This is mainly because there is no extra extensive land areas that are covered by forest and grazing land.

5.1.6 Trend of landholding size of the sample households

Majority of the interviewed farmers (98.5%) in Amiburise Anijulo and (61.5%) in Tikare Anibassa indicated that the size of the agricultural lands was becoming smaller in their communities (table 5.5). About 1.5% of the respondents in Amiburise Anijulo and 38.5% in Tikare Anibassa reported that there is no change in the size of the farm land over time. According to survey result, the decrease in landholdings was attributed to increase in human population (70.9%) which results in sharing land to children, increase in marginal land due to loss of quality (23.1%), land redistribution (2.6%) and land taken away by government (3.4%). In addition to response obtained from household survey, the participants of focus group discussion have confirmed that the high population growth in the study area resulted in land fragmentation and decrease in size overtime. As they reported, due to absence of diversified economic system, and lack of other means of acquiring land, nowadays sharing parents land become the most important way getting farming plots for newly formed households.

Table 5.5 Trend in land holding over time (Multiple answers are possible).

Trend and factors of landholding size change	Respondents				Total	
	Amiburise A		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Trend in landholding size change						
Decrease	64	98.5	32	61.5	96	82.1
No change	1	1.5	20	38.5	21	17.9
Increase	-	-	-	-	-	-
Total	65	100	52	100	117	100
Reason for decline of Land holding size.						
Increasing in human population	38	59.4	30	93.7	68	70.8
Increasing cultivation of marginal land due to loss quality	20	30.7	7	13.5	27	23.1
Land reallocation	3	4.6	-	-	3	2.6
Land taken away by government	4	6.2	-	-	4	3.4
Total	65	100	52	100	117	100

Source: Field Survey (January, 2014)

5.1.7 Constraints of crop production

Crop production is the major source of livelihood. In the woreda both annual and perennial crops are grown on all altitudinal variations.

Types of crops grown are among the factors that affect land degradation. This is because type of crops grown affects the level of tillage, soil nutrient uptake or restoration. According to the information obtained from Misirak Badawacho Woreda Agriculture and Rural Development Office (2013), the types of crops grown in the area include maize, teff, haricot beans and sorghum. According to the level of tillage, maize and sorghum crops grown can aggravated to land degradation, while the haricoats beans crops grown minimizing land degradation in the study area. However, there are multiple constraints to grow crops adequately and in effective way in the study area. Among these constraints, according to the survey result, land shortage, soil erosion, erratic rainfall and low access to

input, are the major ones (Table 5.6). Significant number of the respondents mentioned drought, pest and diseases and labor shortage as main constraints to crop production. Furthermore, focus group discussion participants indicated that the supply of input is not timely. It is always distributed late when the time of sowing partially passed.

**Table 5.6 Constraints to crop production (Multiple answers are possible).
Constraints to crop production respondents**

Constraints to crop production	Respondents				Total	
	Amiburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Drought	6	9.2	5	9.6	11	9.4
Erratic rain fall	7	10.7	6	11.5	13	11.1
Labor shortage	4	6.2	3	5.7	7	5.9
Less access to in put	10	15.4	9	17.3	19	16.2
Land shortage	3	4.6	2	3.8	5	4.3
Pest and disease	5	7.7	5	9.6	10	8.5
Soil erosion	30	46.2	22	42.3	52	44.4

Source: field survey (January, 2014) in study area.

5.1.8 Livestock production

Livestock is an integral part of the farming system in the study area (annex IV). About 96.9% of respondents in Amiburise Anijulo and 98.1% in Tikare Anibassa have livestock of different kinds. As it is indicated, the average size of cattle, owned by households is 1.2 in Amiburise Anijulo and 1.7 in Tikare Anibassa. The average size of goat, sheep and pack animals is 0.6, 2.3 and 0.4 in Amiburise Anijulo, while the figure for Tikare Anibassa is 0.5, 2.1 and 0.3 respectively. Trend in livestock holding overtime is also indicated in annex IV. About 71.4% and 64.7% respondents in Amiburise Anijulo and Tikare Anibassa respectively reported that livestock possession in the study area declined over time. Few respondents (14.3%) in Amiburise Anijulo and 37.3% in Tikare Anibassa replied that the

number of livestock possession becomes increasing through time and only 12.7% in Amiburise Anijulo confirmed that the livestock possession does not show any change. Regarding livestock possession overtime, respondents were also asked to give reasons for their reply. Accordingly, 86.6% of the respondents in Amiburise Anijulo and 69.7% in Tikare Anibassa, who claimed that livestock holdings is decreasing, justified that shortage of grazing land as major causes. About 60% and 48.5% of the respondents in the two respective kebeles justified that lack of money to buy livestock are major causes for the decrease of livestock possession overtime (see Annex IV). The number of respondents who claimed the decreasing trend in livestock holding due to prevalence of diseases is 24.4% and 36.4 % in Amiburise Anijulo and Tikare Anibassa respectively. Moreover, participants of focus group discussions and key informants indicated that there is a tendency of change in attitude among the society towards possessing small number of livestock population with better quality. Nowadays there is introduction of cattle with better quality rather than having large cattle population.

As it has been reflected in annex IV respondents were asked to tell feed sources for their livestock. Accordingly, large numbers of respondents (71.4% in Amiburise Anijulo and 49.1% in Tikare Anibassa respectively) use their own plot of land to graze their animals. About 71.4% and 43.2% of the respondents mentioned crop residue as major source of feed for their livestock while the percentage of respondents who used communal grazing land is 55.5% and 39.2% in their respective kebeles. 57.2% and 17.6% of the respondents in Amiburise Anijulo and Tikare Anibassa use cut and carry system from communal grazing land, marshy and hillside areas respectively.

Annex IV shows the response of the according to the sample household's responses from the study area regarding the size of grazing land overtime. Accordingly, almost all respondents (95.3% in Amiburise Anijulo and 96.1% in Tikare Anibassa) argued that the size of grazing land is decreasing overtime. Only 1.9% in Tikare Anibassa replied that the size of grazing land is increasing overtime whereas 4.7% and 1.9% of the respondents in Amiburise Anijulo and Tikare Anibassa respectively argue that the size of grazing land shows no change overtime.

Respondents were also asked to give reasons for the decreasing trend of grazing land size overtime. About 71.6% of the respondents in Amiburise Anijulo and 73.5% respondents in Tikare Anibassa replied that expansion of farmland is the major reason for the shrinking of grazing land. This indicates that the problem of farm land expansion towards marginal forest area is the main problem in Tikare Anibassa than Amiburise Anijulo kebele. About 51.6% and 44.9% of the respondents attributed it to distribution of grazing lands for cultivation purpose among peoples. Enclosure of degraded areas for restoration purposes is also another reason for decreasing trend in grazing land(see Annex IV).The overall characteristics of the livestock feed sources and grazing land condition favor land degradation in the study area.

5.1.9 Land tenure security

Farmers in the study area are optimistic with the right to the land. Land tenure security has been shown to be an important factor affecting subsistence farmers' decisions whether to practice introduced soil and water conservation measures. The general agreement is that the land users must have secure property ownership rights of the lands they cultivate to invest in SWC works in anticipation of long-term benefits. In a situation where the farmers are not certain to capture the benefits of investment in soil and water conservation on their lands; they will not be willing to devote much effort to soil and water conservation practices. Land tenure security operated increases the sense of responsibility and lengthens the farmers planning horizon. Thus they will be more concerned about the proper use and management of the land. In Ethiopia, land has been under the state control since the 1975 land reform. The land users (farmers) have been given only usufruct right. Studies in different parts of the country have tried to show empirically that land tenure insecurity significantly influences farmers' decisions in land management practices (kebede, 1989: Belay 2002).

Regarding the land Tenure security system, questions were raised to focus group discussions and key informants. Both groups in the study area revealed that the current land tenure system is good to them compared to past regime. This is due to easy access to land through share cropping and renting; more tenure security than before due to (land certification) and declining trend in land redistribution than before. This discussion

asserted that there is no such problem of land tenure insecurity which affects farmer's long term investment on their land to conserve it from further degradation.

5.2 Assessment of land degradation

5.2.1 Forms of land degradation

Land is an important issue for the majority of Ethiopia people who, one way or the other, may depend on agricultural production for their income and subsistence (Samuel 2006:3). It is very scarce and getting scarcer since the population is increasing in size. Expansion of farm lands and irrigation possibilities to increase production are difficult. Land degradation is high and it is well recognized by the farmers in the study area. Almost all the respondents (100%) had agreement in land degradation problem in the study area. As indicated in Table 5.7, the common forms of land degradation in the study area are soil erosion by water, soil erosion by wind, deforestation, and overgrazing and gully formation. About 54.7%, 17.9% and 11.1% of the respondents replied soil erosion by water, deforestation and overgrazing of rangelands as the main forms of land degradation in their locality. 9.4% and 6.8% of the respondents attributed gully formation and erosion by winds as the major forms of land degradation respectively.



Figure 5.1 Development of rill erosion on individual farm lands. Photo by the researcher, Source: field survey (January 2014), in Tikare Anibassa kebele border (Goti name *edolla*).

Table 5.7 Forms of land degradation in the study area (multiple answers are possible)

Types of land degradation	Respondents				Total	
	Amiburise A.		Tikare A.		Freq.	%
	Freq.	%	Freq.	%		
Land degradation problem in study area.						
Yes	65	100	52	100	117	100
No	–	–	–	–	–	–
Forms of land degradation						
soil erosion by water	20	30.8	44	84.6	64	54.7
Soil erosion by winds	9	13.8	2	3.8	11	9.4
Deforestation	18	27.7	3	5.8	21	17.9
Over grazing of range land	11	16.9	2	3.8	13	11.1
Gully formation	7	10.8	1	1.9	8	6.8

Source: Field survey (January, 2014)

Respondents were also requested to identify erosion types in their farmland. Accordingly, 46.2% and 40.4% of the respondents in the two Kebele reported that rill erosion is common soil erosion in their farmland followed by gully erosion which has got attention by 17.1% of the respondents and sheet erosion is the least one that only 5.9% of the respondents replied as it is the main form of water erosion in their farmland. Considerable number of the respondents (13.7%) agreed that all forms of erosion are common in their respective farmland (See Table 5.8). Similarly, owing to the steep nature of the landscape, focus group discussions participants and professionals in the study area fully agreed on the problem of land degradation. Occurrence of erosion is usually depicted without noticing in the farmland and gradually forms small rills and accumulation of silt on the grass or road side after rain. Consequently, the water ways (rills) are becoming big gullies expanding year after year, to the stage of uncontrolled erosion pattern (See figure 5.2).



Figure 5.2 Developments of gully erosion in Tikare Anibassa study area on communal land. Photo by researcher, source: field survey (January 2014), (Goti name Anibassa okota).

Concerning the intensity of erosion on cultivated land, the sampled household heads were asked to tell the severe erosion season. Accordingly, 93.2% of the respondents reported that the highest loss of soil from their plot is taken away during the summer season. 5.1% of the respondents claimed their farm land is exposed to erosion during the spring season and the remaining 1.7% indicated that soil erosion is severe on their farm land during autumn seasons. This indicates that seasonality and torrential rainfall pattern is among the major causes of land degradation in the study area.

Table 5.8 Main forms intensity of erosion by water

Forms and intensity of water erosion	Respondents				Total	
	Amiburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Main form of erosion by water in cultivated land						
Rill erosion	30	46.2	21	40.4	51	43.6
Sheet erosion	2	3.1	5	9.6	7	5.9
Gully erosion	8	12.3	12	23.1	20	17.1
All form of erosion	7	10.8	9	17.3	16	13.7
High intensity of erosion on cultivated land						
Summer	61	93.8	48	92.3	109	93.2
Autumn	1	1.5	1	1.9	2	1.7
Winter	–	–	–	–	–	–
Spring	3	4.6	3	5.8	6	5.1

Source: Field Survey, January, 2014

5.2.2 Causes and consequence of land degradation in the study area

There are different factors contributing for the existing land degradation problem in the study area. The findings of household survey indicated that ploughing steep slopes, lack of fallowing, limited use of conservation structures, cutting trees for fuel and construction purposes, and overstocking are major immediate root causes of land degradation in their order of importance from 1 to 5. According to the information obtained from Misirak Badawacho Woreda Agricultural and Rural Development Office and field observation made, more than 80% of the landscape is hilly and mountainous areas in Tikare Anibassa and Amburise Anijulo.

Table 5.9 The immediate and underlying root causes of land degradation.

The immediate and underlying root causes of land degradation	Respondents				Total	
	Aniburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Over stocking	3	4.6	8	15.4	11	9.4
Cutting trees for fuel and construction	34	52.3	24	46.2	58	49.6
Ploughing steep slopes	3	4.6	15	34.6	18	15.4
Limited use conservation structure	20	30.7	5	9.6	25	21.4
No fallowing	5	7.7	–	–	5	4.3
Total	65	100	52	100	117	100
The underlying causes for land degradation						
Heavy rain fall	2	3.1	7	13.5	9	7.7
Steep topography	3	4.6	15	28.8	18	15.4
Population pressure	60	92.3	30	57.7	90	76.9
Total	65	100	52	100	117	100
Possibility to minimized land degradation						
yes	65	100	51	98.1	116	99.2
No	–	–	1	1.9	1	0.8
Total	65	100	52	100	117	100

Source: Field Survey, January, 2014

Respondents were also asked to indicate the underlying causes of land degradation in the area. Accordingly, 92.3% and 57.7% of the respondents in Amiburise Anijulo and Tikare Anibassa attributed population pressure as main underlying causes for land degradation followed by steep topography which account for 4.6 % in Amiburise Anijulo and 28.8% in

Tikare Anibassa respectively. About 3.1% and 13.5% of the respondents confirmed that heavy and torrential rainfall is the main underlying cause for land degradation.



Figure 5.3 poor restoration results in Tikare Anibassa kebele and area rugged topography. Photo by Researcher, Source: field survey (January, 2014)
Goti name *shoge okota*.

According to the findings of focus group discussions and key informant interview, population is a triggering factor which initiates other causes of land degradation. Population pressure resulted in deforestation, expansion of farming to marginal areas and grazing lands. In addition, they further mentioned that the attention of concerned government officials to take immediate action is less when people encroached in to enclosed area in searching cultivation land and grazing area which contributes to the problem of land degradation. (See Figure 5.4).



Figure 5.4 Expansion of degraded land with no restoration attempts. Picture taken from Tikare Anibassa kebele 521 hectare severely degraded. Photo by Researcher, Source: field survey (January, 2014). (Goti name *Anibassa okota*).

((...the area identified by government as severely degraded and where there is implementation of restoration programme has been taking place, is under quick recovery than other plot of land which is facing from land degradation...) one of key informant Ato Balilo Ofoche.

Regarding the impact of land degradation in the study area, participants of focus group discussions and key informants expressed that land degradation is seriously affecting the livelihood of the local community. Due to land degradation problem, the agricultural lands

currently used for cultivation requires the application of more chemical fertilizers over time. Unless, it is difficult to obtain yields and such degraded lands remains out of use.

Despite the increasing trend of land degradation, participants of focus group discussions stated, so far it has been possible to halt decline in crop yield through relatively better application of inorganic chemical fertilizer in comparison to past time. But the net income from production is negatively affected by an increment in the price of fertilizer and other agricultural inputs. This is further worsened by the rising price of all other consumption goods that farmers are buying from market. Climate change is observed in the study area. All contacted groups revealed that there is change in climate condition over time. The agro-climatic zone which is observed in recent past was mostly moist Weina Dega type. But now moist Weina Dega agro-climate zone as well as Kolla is well observed in the study area. This indicated that land degradation affects climate condition of the study area in the long run. Table 5.9 indicates the possibility to minimize or halt land degradation in the study area.

Accordingly, 100% and 98.1% of the respondents in Amiburise Anijulo and Tikare Anibassa respectively replied that it is possible to minimize or halt land degradation problem. About only 1.9% in Tikare Anibassa indicated impossibility to minimize land degradation in the study area. Respondents were also requested to express the reasons for their responses. Accordingly, those respondents who confirmed that land degradation can be minimized or halted, asserted that if there is cooperation between and among government and the community members, it is possible to minimize or halt land degradation. According to them different actions were proposed to minimize land degradation. Among these actions, construction of physical conservation structures was given more attention. These conservation structures include construction of check-dam, terrace and ditch, cut-off drains and contour ploughing. Moreover, the importance of awareness creation among community members was also considered as a means among measures to be taken. Respondents stressed the supreme importance of government effort in land restoration practices with the involvement of the society as a whole through awareness raising activities. Most of the key informants and focus group discussions asserted that so far no adequate attention has been given by the government towards the

problem of land degradation in the study area and that is aggravating the problem. However, nowadays the issue of natural resource degradation has got the attention of many stakeholders. They further noted, land is the basic resources for the local community and the country as well, and unless there will be strong effort from the government to curb the existing trend of degradation, the result would be disastrous or even irreversible.

5.3 Local response to land degradation problems

In this part effort has been made to discuss the response to land degradation. This section mainly deals with soil fertility improvement activities, soil and water conservation practices and trend of land restoration practices of degraded land.

5.3.1 Land restoration efforts in Misirak Badawacho Woreda

The current pressure on land is already recognized and land degradation becomes a common problem in the study area. As a result, different land management and restoration practices are undertaken by the local community. The following section discusses different land management practices in the study area.

5.3.2 Soil fertility improvement practices

Farmers at individual level practice different land management activities mainly to increase agricultural yields and conserve the farming plot. They practice a short-term benefit oriented soil fertility management and long-term benefit oriented land resource management activities. For short-term effort, farmers apply chemical fertilizers to obtain high agricultural yield. Inorganic chemical fertilizer application is used (table 5.10) in the study area as many parts of the country experience due to loss of soil fertility by water erosion.

According to survey results, crop rotation (in Amiburise Anijulo and Tikare Anibassa 75.4% and 80.8% of the respondents respectively) is one of the most important methods of improving soil fertility as well as conserving soils on cultivated fields. It is a method through which the nutrient content of the soil is improved by cultivating different crops interchangeably on the same plot of from year to year land. This method again becomes more important when leguminous crops are part of the rotation system to improve the

nitrate content of the soil (Woreda agricultural and development office). According to the information obtained from focus group discussion and woreda experts, this system is one of the widely practiced system of soil fertility improvement in the study area which helps to improve outputs from the cultivated land. The rotation system mostly consists of cereals, legumes (haricot bean) and root crops like potatoes in the farm land in different seasons and years of cultivation.

Manure is also used for promoting the fertility status of the soil. Its application to farmland raises the nutrient level of the soil, increases water infiltration and reduces soil erosion. About 50.8% and 19.3% of the respondents in Amiburise Anijulo and Tikare Anibassa respectively use manure to improve soil fertility. Currently, application of manure on farm lands has decreased from time to time as the number of livestock per household significantly declined for various reasons. Participants of focus group discussions indicated the shortage of manure confine the use of manure only for homestead area rather than far away from their home. In addition, the use of cattle dung as source of fuel for cooking instead of using it as organic fertilizer is another contributing factor for low application of manure for soil fertility improvement practice in the study area. Regarding fallowing to improve soil fertility, the survey result indicates small contribution. Only 9.3% and 7.7% of the respondents in Amiburese Anijulo and Tikare Anibassa used fallowing to improve soil fertility respectively. In view of focus group discussion participants, no fallowing that can contribute to soil fertility improvement in the study area. Because of high population density, farmers have no chance to leave the land uncultivated.

Table 5.10 Response of local farmers land degradation in the study area

Response of local farmers land degradation in the study area	Respondents				Total	
	Amiburise A		Tikare A		Freq.	%
	Freq.	%	Freq.	%		
Land restoration Practices						
yes	63	96.9	51	98.1	114	97.4
No	2	3.1	1	1.9	3	2.6
Soil fertility improvement in farm land.						
Chemical fertilizer	61	93.8	50	96.2	114	97.4
Crop rotation	49	75.4	42	80.8	91	77.7
Manuring	33	50.8	10	19.3	43	36.7
Fallowing	6	9.3	4	7.7	10	8.5
Main land restoration practices in your area						
SWC	48	73.8	49	94.3	97	82.9
Area closure	40	61.5	22	42.3	62	52.9
Agro forestry	15	23.1	25	48.1	40	34.2
SWC practices						
Contour ploughing	60	92.3	50	96.2	110	96.5
Stone bunds	29	44.6	25	48.1	54	46.2
Hill side terracing	59	90.8	50	96.2	109	93.2
Ditches	55	84.6	47	90.4	102	87.2
Forage stripe	15	23.1	10	19.3	25	21.4
Check-dam	30	46.2	8	15.4	38	32.5
Mechanisms for gully treatment						
Check- dam	52	80	30	57.7	82	70.1
Cut of drains	51	78.5	45	86.5	96	82.1
Planting tree and grasses.	49	75.4	43	82.7	91	77.7

Source: Field Survey, January, 2014

5.3.3 Soil and water conservation practices

In the study area, as many parts of Ethiopian highlands, farmers have a pool of indigenous knowledge with which they use and manage their land resources. They make efforts to conserve their soils against erosion by applying a range of conservation techniques. In 100% of the respondents both in Amiburise Anijulo and Tikare Anibassa confirmed that they protect soil from erosion through contour ploughing. To establish the structure, the farm plots are ploughed horizontally; following contours so that those contour furrows are created with the help of iron plough. As it was discussed with the Woreda expert, the furrows that are formed along contours help to hold the water until it infiltrates into the ground. Hence it reduces the erosive effect of surface runoff on plots of land.

Traditional ditches are the most extensively practiced soil and water conservation measure in the study area. According to survey results, about 84.6% and 90.4% in Amburise Anijulo and Tikare Anibassa respectively practice traditional ditches in almost all of their farm plots on individual basis except homestead areas. Homestead areas are less affected by erosion because of the availability of banana plants and enset. The structures are established with the help of oxen-plough deep into the ground. This kind of practice has been used by farmers since longer times. During the field-observation, it was discussed that these structures are usually built when the land is being prepared for sowing to minimize the problem of seed loss. In addition, it also minimizes water logging problems.

According to information obtained from development agency, a group of two or more farmers who possess neighbor farm plots prepare water ways at the top of the slope. This is a common practice in the study area as this area is found at the base of hillside. It helps protect crop fields from being damaged by powerful run-offs that come in from steep sloppy area.

Findings from the survey respondents indicated that hillside terracing and check-dams were among the most frequently used physical structures for soil and water conservation. However, it was noted from the discussion held with focus group discussions and key informants that the terracing and check-dams were of poor quality and serve only for a short period of time. Moreover, the potential positive impacts of the conservation attempts

had also been reversed by the simultaneous devastating act of the farmers themselves for cultivation, and free grazing. In some cases forage strip and stone bounds are used as another technique for soil and water conservation practices.

In the view of focus group discussions and key informant, in combination of biological treatment of soil and water conservation activities are being practiced with the physical soil and water conservation structures. These practices were recently introduced to the area by government and local NGOs i.e. World Bank. According to the information obtained and observation made by the researcher a multi-purpose trees and shrubs, legumes and grasses are some of the biological methods used to protect the land from erosion. The treatment of the land takes place in comprehensive way in cultivated lands, grazing lands, forest areas and marginal lands of the study area.

5.3.4. Gully restoration practices

Gullies are long and deep channels than rills and formed are by concentrated runoff from the surrounding sloping land. Usually, gullies develop from rills. Most of the reasons for gully formation in the study area. Deforestation, cultivation of steep slopes, overgrazing and insufficient soil conservation measures are the main reasons for gully formation in the study area. In order to curb gullies, check-dam was widely constructed along water ways from tree shrubs or stones. This eventually helps raise the floor up to the level of surrounding and original ground. Cut off drains and planting trees and grasses along water ways are additional gully restoration practices in the study area (See Table 5.10).

5.3.5. Agro- forestry practices to stabilize the structural measures

Agro-forestry is the practice of planting and management of trees or shrubs in cropland and/or pasture lands to get economic and/or ecological benefits from the integration between crops or livestock and the trees or shrubs. In agro-forestry systems, the trees or shrubs can be grown with crops at the same season and in the same field or in the same field at the different season. In the study area for instance maize can be produced in combination with haricot bean, cabbage, potato and pepper. According to the observation made in the study area, the agro forestry practice was designed to involve planting of shrubs and trees along the soil and water conservation structures, mainly meant to establish

the bunds. Edible fruits like apple, and saspania and lucinia lucosophala, which can be used for forage purposes, are used to protect soil from erosion. Planting of trees and shrubs of multi-purpose species on the soil bunds were a component of community based natural resource management activities. This agro forestry and a forestation components involved establishment of nursery. In addition to soil and water conservation and soil fertility maintenance, the seedlings produced at the nursery were also meant for meeting the fuel and construction wood demand of the population and production of animal fodder.

5.3.6 Trend in land restoration practices

Respondents were asked to express the trend in land restoration practices in their localities overtime. Most of the respondents (as indicated in Table 5.11) replied that land restoration practice in their village has been increasing from time to time. This indicates the increase of awareness of community about the negative impact of land degradation. Those who replied the land restoration practice, as “decreasing” over time, gave justification for the pressure of people and lack of alternative means of livelihood for their existence rather than neglecting the degradation problem and consequence.

Table 5.11 Trend in land restoration practices overtime.

Trend in land Restoration practices over time.	Respondents				Total	
	Amiburise A.		Tikare A.		Freq.	%
	Freq.	%	Freq.	%		
Increasing	45	69.23	43	82.7	88	75.2
Decreasing	16	24.6	7	13.5	23	19.7
No change	4	6.2	2	3.8	6	5.2
Progress in Land resource conservation						
yes	41	63.1	35	67.3	76	64.9
No	20	30.8	16	30.8	36	30.8
Undecided	4	6.2	1	1.9	5	4.3

Source: Field Survey (January, 2014)

Key informant from Misirak Badawacho Woreda (ARDO) expressed that trend in land restoration practice among the community members is increasing over time. According to

the key informant most of the people are willing to practice soil and water conservation activities either on their own farm land or together with neighbors on community land at village level. Before this time, most of the people were reluctant to cooperate and even they seek other benefits for the construction of physical structures on their farm land. But now, despite some, they are practicing these structural conservation measures and even support the act of closing degraded areas from the reach of people and other animals.

5.3.7 Observed changes in land restoration practices

Generally, effects of land restoration works require a long period of time to be appreciable by the people. Yet, people can easily notice if there have been any visible changes in a short time as well. Respondents were asked to tell whether there is change in the land condition they may have observed since land restoration works started. Accordingly, 56.2% respondents in Amiburise Anijulo and 44% in Tikare Anibassa witnessed changes in land management practices. About 34.8% and 47% of the respondents in Amiburise Anijulo and Tikare Anibassa respectively replied that there is no observed changes occurred as a result of land restoration practices. The rest 9% in Amiburise Anijulo and 9% in Tikare Anibassa lack confidence to sort the practices as progress or not. Respondents were also requested to mention any changes observed in land condition as a result of land restoration practices. Some of the changes, according to them include natural regeneration of severely degraded areas, better growth of crops along soil and water conservation structures due to entrapped sediments.

5.4. Socio-economic and institutional factors affecting land restoration practices

5.4.1 Productivity of the farm land

The productivity of cultivable land can facilitate or deter the involvement of a household in land restoration practices. As it is indicated in Table 5, 12 the majority of the respondents (89.7%) replied that the productivity of their farm lands is decreasing over time. Only 7.7% and 2.6% of the respondents agreed that the productivity of land increased and never show changes respectively. These respondents were also asked to list reasons for the declining of farm land productivity. Accordingly, decrease in soil fertility, erratic rainfall and farmland fragmentation and decrease in its size stand 1st to 3rd in rank for the

declining of farm land productivity (See Table 5.12). The participants of focus group discussions mentioned that decrease in rainfall and its irregularity and farm land size brought about by the population pressure are the two serious causes for the declining of productivity of farm lands overtime.

Table 5.12 Productivity of land over time

Productivity of land	Respondents				Total	
	Amiburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Increasing	11	16.9	4	7.6	15	12.8
Decreasing	56	86.2	49	94.3	105	89.7
No change	1	1.5	2	3.8	3	2.6
Reasons for decreasing land productivity.						
Decrease rain fall	41	63.1	35	67.3	76	64.9
Decrease in farm size	42	64.6	30	57.7	72	61.5
Decrease in soil fertility	45	80.4	46	88.5	91	77.7
Reason for increasing land productivity						
Access to new land	2	3.1	3	5.8	5	4.3
Better land management	9	13.8	2	3.8	11	9.4
Benefit from agricultural technologies	6	9.2	2	3.8	8	6.8
Adequate rain fall	6	9.2	1	1.9	7	5.9
Use of fertilizer	7	10.8	2	3.8	9	7.7

Sources: field survey 2014

As it can be seen from the Table 5.12, those respondents who replied the productivity of land as increasing gave different reasons. Accordingly, better land management benefit from agricultural technologies and use of inorganic fertilizers are the major reasons for the increment of output of cultivated land over time. The key informants of DAs confirmed

that the land resource of this area is productive if it is well handled. In addition, they raised some examples of farmers who obtained high yield in the past three years due to their effort to maintain the soil resource of their land. As it can be understood from the above discussion, the combined effect of a number of factors such as soil fertility decline, erratic rainfall condition and decrease in farm land due to population growth are the major obstacles for the production of enough crops to the society and in turn this has led to the decrease in the investment made by the farmers in relation to land management practices.

5.4.2 Involvement in off-farm activities

Involvement in off- farm jobs is common in the study area. Its own effect on land restoration practices. As poor farmers generally hold small land, they are more often engaged in off farm activities such as petty trade, daily labor work, handicraft and small scale trading and brewing local beverages (*keneto*, *shameta* and *Arake*). This can decrease their interest to invest on soil conservation practices (Ludi 2004). As one can see from Table 5.13, 73.5% of the respondents replied that some members of their family are involved in off-farm activities, while 26.5% of the respondents replied that none of their family members has involvement in these activities. Those respondents, who are involved in off farm activities, were asked to indicate the type of activities they were involved. Accordingly, 29.3% and 42.4% of the respondents' family members were engaged in petty trade in Amburise Anijulo and Tikare Anibassa kebeles respectively, while 14.6% and 27.3% were laborers in their respective kebeles. About 34.2% and 9.1% and 21.9% and 15.2% of the respondents' household members in Amburise Anijulo and Tikare Anibassa were engaged in handicraft activities and government employment respectively. The rest 14.6% in Amiburise Anijulo and 18.4% in Tikare Anibassa were engaged in brewing local beverages.

The sampled households who are involved in off farm activities were asked if the activities have any influence on land restoration practices. Accordingly, 40(64.5%) respondents of those whose family members involved in off-farm activities replied that such activities either positively or negatively influence their involvement in land rehabilitation practices in their locality. Twenty-two respondents (36%) indicated that these activities do not have any impact upon their involvement in any land rehabilitation practices

Table 5.13 Respondents' family members involvement in off-farm activities (Multiple answers are possible).

Family members Involvement in off-farm activities	Respondents				Total	
	Aniburise A.		Tikare A.			
	Freq.	%	Freq.	%	Freq.	%
Involvement in off-farm activities						
yes	48	73.8	38	73.1	86	73.5
No	17	26.2	14	26.9	31	26.5
Off-farm activities the HHs involved						
Brewing local beverages	7	14.6	7	18.4	14	16.3
Handicraft	14	34.2	3	9.1	17	22.9
Laborer	6	14.6	9	27.3	15	20.3
Petty trade	12	29.3	14	42.4	26	35.2
Government employment	9	21.9	5	15.2	14	18.9
Influence of off-farm activities on land restoration practices						
Yes	29	70.7	27	81.8	56	75.7
No	12	29.3	6	18.2	18	24.3

Source: Field Survey, January, 2014

Respondents were also asked to indicate the reason for their reply. Those respondents who confirmed the influence of off-farm activities on land restoration practices indicated that if family members spend time outside their farm land, they cannot consider/recognize any land degradation problems and hence give no attention to land restoration practices. In addition, they cannot contribute labor supply for any land restoration practices in their community. In contrary, those who replied that off-farm activities have positive effect on land restoration practices pointed out the following:

- ✓ Involvement in off-farm activities reduces a pressure exerted by all family members on land resource for their livelihood.

- ✓ May invest the income they earn outside their farm land on soil and water conservation practices, for instance, by buying and planting some fruits and vegetables.

5.4.3 Increase in size of population

Population growth is one of the important factors, which determine the effort made to restoration degraded areas. The increase in the size of the population can influence land restoration practices either positively or negatively depending on the issue whether it has led to intensive or extensive agricultural practices in the area. As it can be understood from Table 5.14, 61.5% of the respondents replied that increase in size of population in a given area result in decrease in the involvement of the society on land restoration practices. While 34.2% of the respondents indicated that with the increase in population size, the involvement of their community in land restoration practices increases. Respondents were also asked to give reason for their reply. Accordingly, most farmers who replied that there is decrease in land restoration practices as population size increase in a given area, it exerts great pressure on land resources and hence no room for land restoration practices. As the participants of focus group discussions indicated, the increase in human population results in:

- ✓ No fallowing of agricultural land
- ✓ Expansion of cultivation to marginal forest and grazing land and extremely hilly nature of the terrain.
- ✓ Increasing demand in forest and forest product. The above discussion indicated that as human population size in a given geographic area increases it exerts a great pressure on available natural resource and hence affects land restoration practices negatively in the study area. Those respondents who replied “increasing” have also given their reasons. Most of them replied that as human population size increases labor supply also increases and due to this population increase positively influence the involvement in land restoration practices.

5.4.4 Family members motive to involve in land restoration practices.

Regarding the involvement and support of household members to land restoration practices, 60% and 78.8% of sampled household heads in Amiburise Anijulo and Tikare Anibassa confirmed that their family members are willing to participate in any natural resource conservation activities. While considerable number of respondents i.e. 40% and 21.2% in Amiburise Anijulo and Tikare Anibassa respectively replied that there is no motive of the household members to involve in land restoration practices (See Table 5.14). This is mainly due to declining trend of land productivity and involvement of the household members in off-farm activities.

5.4.5 Assistance/cooperation of neighborhoods for land restoration practices

Respondents were also asked to tell the assistance and cooperation of the neighboring people to land restoration practices. Accordingly 40 and 19 respondents in Amiburise Anijulo and Tikare Anibassa respectively indicated that there is cooperation among the societies to restoration degraded areas on their farm plot and community lands. 24 and 24 respondents in Amiburise Anijulo and Tikare Anibassa respectively show that some people in their localities are not willing to perform any resource management practices.

Table 5.14 Involvement of the society on land restoration practices.

Item	Respondents				Total	
	Aniburise A.		Tikare A.		Freq.	%
	Fr.	%	Fre.	%		
Involvement of society as population increase.						
Increasing	30	46.2	10	19.3	40	34.2
Decreasing	33	50.8	39	75	72	61.5
No changes	2	3.1	3	5.8	5	4.3
Family members involvement in land restoration.						
Increasing	39	60	41	78.8	80	68.4
Decreasing	26	40	11	21.2	37	31.6
Cooperation of neighborhood for land restoration practices.						
Increasing	40	61.5	19	36.5	59	50.4
Decreasing	24	36.9	24	46.2	48	41.1
No change	1	1.9	9	17.3	10	8.5

Source: Field Survey, January, 2014

A number of reasons were indicated by the respondents as to why the assistance gained increase or decrease over time. The sampled household heads who indicated decrease in assistance over time gave the following reasons:

- ✓ People give more attention for short-term benefits rather than working for long-term benefits.
- ✓ The deterioration of the social tradition of helping each other (in some cases). This is due to the fact that many people are trying to focus on their personal gains rather than social benefits
- ✓ Wherever the productivity of land decreases, people are inclined toward off-farm activities and this in turn discourages the need for assistance from other households.

Those respondents who indicated that the assistance gained from other households is increasing mentioned such as:

- ✓ Increase in the level of awareness among some communities to minimize problems of land degradation in cooperated manner than performing at individual level.
- ✓ A need to win challenges of life in common.

All contacted groups i.e. sampled household heads, focus group discussions and key informants argue that there is an increase in awareness among communities regarding the problem of land degradation. As a result, there are extensive efforts made by all stakeholders to conserve natural resources and to perform land restoration practices in the study area.

5.4.6 Access to extension services related to land restoration practices

Any new agricultural practices in particular area need adequate mechanism for transmitting information. Lack of relevant and timely information can prevent a widespread practice of natural resource conservation activities.

Access to extension services helps farmers to gain better understanding of the potential effects of soil erosion and benefits of soil and water conservation practices as well as enhancing knowledge on the application of soil and water conservation technologies. In the

study area, as it can be seen from Table 5.15, respondents were asked whether they have access to any extension services related to land management practices. Accordingly, 74% of the respondents replied that they have access to extension services that promote land management practices. Significant number of respondents (26%) reported that they have no any access to extension services related to land restoration practices. Those respondents who have access to extension services were asked whether they implemented it on their land or not. Accordingly, 66.2% and 69.2% respondents in Amiburise Anijulo and Tikare Anibassa replied that they implemented soil and water conservation structures on their farm land. The services they got as a result of extension programs include technical advice on the utilization of chemical fertilizer, improved seed and pesticides, better farming methods and soil and water conservation practices (terraces and check-dam construction, water harvesting and compost preparation). However, as they reported, the services were not enough to effectively minimize or halt natural resource degradation as compared to the magnitude of the problem.

Table 5.15 Access to extension service related to land restoration practices

Access to extension service related to land restoration practices	Respondents				Total	
	Amiburise A		Tikare A		Freq.	%
	Freq.	%	Freq	%		
Access to extension program						
Yes	50	76.9	37	71.2	87	74
No	15	23.1	15	28.8	30	26
Extension programs implemented by HHs						
Yes	43	66.2	36	69.2	79	67.5
No	22	33.8	16	30.8	38	32.5
Source of information for land management						
Traditionally	37	56.9	23	44.3	60	51.3
From neighbors	11	16.9	14	26.9	25	21.4
From Das	65	100	27	51.9	92	78.6
From NGOs	15	23.1	10	19.3	25	21.4

Source: Field Survey, January, 2014

Table 5.15 shows the source of information for the respondents to carry out land restoration practices. In the study area, according to the survey report, development agency are the major source of information for land restoration practices followed by the traditional sources (own experience) by which farmers use to carry out soil and water conservation practices. About 21.4 % and 21.4 % respondents indicated that NGOs and people in the neighborhood respectively are sources of information for land restoration practices in their own and communal lands. Regarding the work of development agency as source of information, focus group discussion participants said that the number of development agency working in a Kebele is three and this helped them to reach the society easily to give timely advice and technical support for SWC practices.

5.4.7 Government efforts in the restoration of degraded lands in the study area

Land restoration practices, as issues of special concern, are within the limit of the Misirak Badawacho Woreda Agricultural and rural development office. Due to increase in human population pressure, terrain nature of land, over-cultivation, deforestation and irregular rainfall pattern, the agricultural production in the study area has been decreasing over time. In order to increase farm productivity and conserve the resource base of the Woreda. Primarily, restoration efforts were introduced with the objectives restoring degraded lands and as well increasing food security through increased food crop production (Adbacho, 1991). As a result, most of the restoration structures for the construction of physical soil and water conservation measures and afforestation and agro-forestry components, were practiced to protect land degradation. Some widely used structural land restoration measures are described in the following few sections in the study area.

5.4.7.1 Soil bunds

Soil bunds are constructed during the dry season that do not interfere land preparation for cropping. The construction is aimed on reduction and stopping velocity of runoff. It increases soil productivity by capturing moisture and crop yields over time. Soil bunds can easily be integrated with grasses, shrubs, growing cash crops, root crops like sweet potato and taro, tubers like enset, fruit trees like avocado, growing after their development. Grazing animals on bunds damage the structures. Restoration practice of soil bunds is

always started from the top of the watershed area/slope and from the waterway. If the bund construction is started from the bottom of the watershed area and if it is not completed in one season, then all water from the top of watershed area will destroy the lower one (Taffa, 1983). Since the beginning of introduced soil conservation measures in 2007, there was a continuous construction of soil bunds, yet there is delay in implementation. In 2007, 2008 and 2009 the length of constructed soil bund in the study area was 280.45km, 381.5 km and 270 km, respectively. However, the trend of constructing soil bunds declined as of 2010. Between 2010 and 2011, the district's agricultural and rural development office planned to construct 360km of soil bunds in each year. But around 249.6 km and 315 km soil bunds were accomplished in 2010 and 2011. Although maintenance was planned for five years plan 2012-2016 for the construction a total 297 km, of land has been planned to be treated with soil bunds and over the 5 years' period soil bunds. According to the report indicated Woreda agricultural and rural development office, (2013) about 130.5km, of soil bunds construction was done in the first three years of the plan.

In Amiburise Anijulo and Tikare Anibassa Kebeles, soil bunds construction was done about 5 km and 4.5 km, respectively. Also 15.2 km and 15.2 km soil bunds were maintained and preserved in Amiburise Anijulo and Tikare Anibessa, in the year 2013, (Misirak Badawacho Woreda agricultural and rural development office 2013).



Fig.5.5 Soil bunds in Amburise farm land (goti name Edolla). Source: field survey, January 2014.

5.4.7.2. Fanya juu

This is an embankment constructed by throwing the soil dug from basin to uphill and the term was coined from Swahili language; meaning “throwing up-hill (Woldeamlak, 2003). This conservation structure is also constructed during dry season. The aim is to reduce and stop erosion and increase water holding capacity of the soil so as to enhance crop yield. The main benefit of fanya juu is its capacity to become bench terrace within few years than soil bunds, yet it has overtopping and breakages (Lakew et al. 2005). Fanya juu is usually applied in cultivation land with slopes above 3% and below 16% gradient. It can also be constructed in uniform terrains with deep soils. Moreover, it has a potential to increase/sustain soil productivity and environmental protection. Integration with grasses and composting is suitable in fanya juu soil conservation measure. To increase the

efficiency of fanya juu, a group of 5-20 households work together. Fanya juu is commonly practiced in Ethiopia in several areas following its introduction over 2 decades ago. Fanya juu is a term coined from Swahili language, meaning throwing up-hill. The construction of fanya juu takes less space than soil bunds and accelerate bench development, thus, complaint about space can be greatly reduced with fanya juu terraces (WFP, 2005). But the great similarity rises from that embankments of soil bunds and fanya juu terrace are laid following contour of fields. The district's agricultural and rural development office merged the soil bunds and fanya juu structures in its plan and claimed to construct 1000 km structure (soil bunds and fanya juu) and maintenance of 500 km of various conservation structures in 2012/13. Specifically, 3.5 km fanya juu was constructed in Amburise Anijulo Kebele in 2012. No maintenance was made for these structures rather some structures were destroyed and change into cultivation fields.

5.4.7.3. Cutoff drains

As many of other structural land restoration practices measures, cutoff drains are constructed during dry season to avoid impediment to land preparation for main cropping season. This structure is a graded channel constructed mainly in moist area to intercept and divert the surface runoff from higher slopes and protect downstream cultivated land or village. On the contrary, cutoff drains in dry area are used to divert runoff and additional water into cultivated fields to increase soil moisture. According to the report indicated WARDO, soil bunds was construction between 2010 and 2011 done about 55.38 km and 60.5 km respectively, cutoff drains on erosion prone areas. In 2012 the construction of 27.67 km, was completed and 30 km, of cut-off drains were constructed in 2013. The construction was also made by traditional way through the use of oxen and digging by hand.

5.4.7.4. Waterways

Waterways can be natural or manmade drainage channel to receive diverted runoff from cutoff drains in upper slope. The waterway carries the excess runoff to rivers, reservoirs, or gullies safely without causing more erosion damages (Lakew *et al.*, 2005). According to report indicated Woreda agricultural and rural development office, (2013) drainage

channel was done in Amiburise Anijulo and Tikare Anibassa about 3.5 km and 1.5 km respectively.

5.4.7.5. Check dams

Check dams for the gully control may be made of stones, soils or brush-woods. In the study area stone is hardly enough to make check dams. Dominantly, the brush-woods and soil are used to construct check dams. Diverting runoff from cultivation field to the main and community road is very common in the study area. Nowadays, creation of awareness among community supported the gully restoration and use of brushwood and stone check dams (if available) in the communal lands, community roads and in farm fields. Tree branches and grassed soil are used traditionally and effectiveness is constrained by erosive of rainfall and size of channel. According to woreda agricultural and rural development office 19 km and 17.2 km check dams were maintained and preserved in the communal lands in Amburise Anijulo and Tikare Anibessa respectively, in the year 2013.

5.4.7.6. Hillside closure

It is the closure of area and denying access to all human and livestock activity, and allowing it to recover by natural process. According to agricultural and rural development office of Misirak Badawacho woreda, communal lands have been closed in Amburise Anijulo and Tikare Anibessa, about 600 ha and 300 ha respectively, in the year 2012.



Fig.5.6 Stone bunds construct in Meles Zenawi memorial Park in Amburise Anijulo hillside. Source: field survey January 2014.

Among the activities performed on former Prime Minister Meles Zenawi memorial Park the site found in study area in Amburise Anijulo at communal land. The following efforts are made to recovering in Amburise Anijulo hillside.

- ✓ 2 km of diversion canal.
- ✓ 8,000 elephant grass with 92% survival rate
- ✓ 1800 Acacia Saligina and 12300 Gravellia Robusta seedlings
- ✓ 3kg of Suspania direct sowing
- ✓ 9200 slices of Desho grasses
- ✓ 4230 trench construction



Fig.5.7 Elephant grasses in Amburise Anijulo border Between Banitewosen kebele. Source: field survey January 2014



Fig 5.8 Restoration efforts attempts in Meles Zenawi memorial Park in Amburise hillside. Source: field survey, (January 2014).

This indicates that there are challenges that encountered land restoration practices in the study Woreda. However, there are examples of practices accomplished by productive safety net program (PSNP) and sustainable land management programs (SLMP).

Regarding the challenges, the findings of key informants and focus group discussions are summarized as follows:

- ✓ Poor supervision of soil fertility improvement and soil and water conservation works performed by farmers and assisted by development agency, lack of reward or incentives to motivate these practices and lack of technical support are some of the problems observed among government officials
- ✓ The planning and introduction of soil and water conservation practices have been done without involving the local community which creates resistance among some group of people to accept the introduced new structures.
- ✓ The use of natural resource in the study area base only on fulfilling the immediate needs of the society rather than considering the long-term effect. This limits soil and water conservation measures in the study area
- ✓ There is strong desire among people of the study area for the implementation of soil and water conservation on their farm lands through productive safety- net programs beneficiaries without their involvement. When farmers are told to construct terraces on their farm land, they reply that those beneficiaries of the PSNP should construct any soil and water conservation structures in their farmland.

5.4.8 NGOs effort in the restoration of degraded land in the study area

The numbers of NGOs which are concerned with performing different development projects in Misirak Badawacho Woreda are few as compared to other Woredas. Among these, World Bank is one local NGO which widely involved in environmental restoration works.

According to the information obtained from World Bank office, the activities of rehabilitating the degraded areas started in 2007. At the beginning, the main activity of World Bank was sensitization and mobilization of the society through panel discussion, workshops, training and establishing community committees. Then establishment of

nursery and seedling production, plantation and distribution among the societies are the main tasks of World Bank. In addition, distribution of fruits and coffee seedlings in order to introduce agro forestry practice is part of the activities. Moreover, soil and water conservation structures are practiced on individual lands to minimize soil loss and to increase productivity of farm land. With the involvement of the society and government cooperation extremely degraded areas around hill side are enclosed to protect from encroachment of livestock. World Bank, on the study area, to minimize the pressure exerted on natural vegetation by human being, is working on alternative energy sources. Among these activities, training on biogas construction and fuel saving stove construction and distribution are the main ones. In addition, an alternate way of constructing houses i.e. construction of model mud house block is being introduced in the district and training has been given for the society on how to make a mud block and how to construct it. Promotion of non-farm activities is another activity practiced in the district. These activities help the society to earn their livelihood other than farm activity and reduce pressures to be exerted on land resources by promoting conservation activities. The non-farm activities currently being practiced in this study area by World Bank include:

- ✓ Establishment of poultry farm and distribution of chickens
- ✓ Provision of beehives with accessories
- ✓ Provision of grafted high land fruit trees
- ✓ Purchase and provision of sheep and/or goat
- ✓ Treadle pump provision
- ✓ Training on business entrepreneurship
- ✓ Construction of bridges, land dug well etc.

What can be understood from this is that there are extensive activities launched by NGOs to promote the living standard of the people by raising the awareness of communities regarding environmental management practices. Despite these efforts, as World Bank officials reported, there are different challenges encountered the implementation of the activities. Among these the following are some to mention:

- ✓ Inadequate awareness among the societies toward long term benefits obtained from land restoration practices.
- ✓ Ignorance of government officials toward measures to be taken to punish those who violate rules and regulation of natural resource conservation including enclosed areas. This is mainly due to absence of alternative ways to direct people to engage in other activities.
- ✓ Inaccessibility which limited the distribution and practice of land management and restoration activities around part of the district Misirak Badawacho Woreda
- ✓ Land shortage occurred as a result of high population growth which limits the land restoration practice at a wider range.
- ✓ There is also an effort made by Africa Development Bank (ADB) in Misirak Badawacho Woreda mainly to restoration practices in the degraded water shades area.

According to the information obtained from Misirak Badawacho Woreda Agricultural and rural development office, in Duduye Bisani Guracha sub-water shades land restoration practices are underway. Among the activities performed by ADB the site found in neighbor of the study area 1st chaffa and 1st keraniso kebeles. The following land restoration efforts are made in communal land and individual farm land:

- ✓ Rain water harvesting
- ✓ Tree plantation
- ✓ Compost preparation

Despite the activities practiced in this area, there are challenges which encounter the implementation. Among these, owners of private lands in critical water shades may not adhere to the agreed land use after treatment. This indicates that there is low level of understanding among the communities toward benefits obtained from long-term land restoration practices and hence inclined toward short-term benefits from these practices.

CHAPTER SIX

Conclusion and Recommendations

6.1 Conclusion

This study has attempted to investigate the challenges and prospects of land restoration practices in Msirak Badawacho Woreda, Hadiya Zone of SNNPR, in Ethiopia. The findings of the study indicated that the livelihood of the farmers in the study area depends on subsistence agriculture. For all sampled households the major economic activity is based on mixed farming (about 92.3%). The average size of farm land owned by farmers is less than one hectare and limits the amount of agricultural production in the study area.

As the findings indicate that the study woreda has serious land degradation problems. Thus, land degradation problem is appeared to be one of the major challenges of crop production. Rill erosion is commonly observed in farmland whereas gullies are common in communal lands and edges of farm lands. Limited use of conservation structures, lack of fallowing, steep slopes cultivation and deforestation, overstocking are the major immediate root causes of land degradation. The underlying causes of land degradation as identified by the study are population pressure, nature of the slope and erratic rain fall pattern. 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 into marginal lands due to population pressure. This expansion of farming towards marginal area resulted in shortage of grazing land, deforestation and increasing trend in land degradation.

The livelihood of the sampled households in the study area is affected by land degradation problems. Hence the productive lands become less productive and subsequently left uncultivated. About 100% of the sampled households recognized that there is land degradation in their locality and about 23.1% of the sampled households agreed the decline of the quality their land, due to the fell in land hold size.

Regarding response to land degradation problem, there have been a range of land restoration practices underway in the study area by local communities, government and non government organizations. The activities practiced in the study area include soil

fertility management activities, soil and water conservation structures and restoration degraded lands by agro- forestry, afforestation and closure. The survey results and personal observation indicate that there are a marked change occurred on the land resource land restoration practices. However as compared to the magnitude of the problem, these land management and restoration practices are not enough to curb land degradation problem. There are also challenges that affect land restoration efforts in the study area. The study revealed that different socio-economic mainly increase human population and institutional factors affect land restoration efforts in the study area. With the increased population, there is subsequent increase in the size of cultivated land which in turn resulted in the shrinking of grazing lands. Continuous search for new cultivable land also challenges the construction and maintenance of soil and water conservation practices.

As the finding of the study revealed slightly more than 50% of the sample population have willingness and cooperation to involve in land restoration practices. This indicates the increase of awareness of the community about the negative impact of land degradation. But the population which accounts nearly 50% did not show any willing to involve inland management and restoration works, due to exhaustion of the fertility of land and subsequent reduction in farm yields, deterioration of social values of helping each other and subsequent focus on personal gains, and decrease in productivity of land which discourage the need for additional labor from outside. Economically, the decreased productivity of farm land and involvement in off- farm activities reduce the number of people from participating in land restoration practices. In addition, people who engaged in off-farm activities cannot contribute labor supply for any land restoration practices.

Regarding to the institutional support and other related factors, though efforts being made were reported by the government and non government officials in the study are not enough to halt the problem of land degradation. From this, it is possible to conclude that inadequate integration of the government measures with local communities during planning and implementation of different soil and water conservation activities are some of the problems observed in the study area.

In general, among the considered socio-economic and institutional factors that influence land restoration practices, the increasing number of population, involvement in off farm

activities, decline in farm productivity, and inadequate attention paid by government toward securing alternate means of livelihood to ease pressure on land, the need to obtain short term benefits rather than long-term from land are major cause of land degradation.

6.2 Recommendations

The findings of the research indicate that there is increasing trend in land degradation problem in the study area. Different land management activities are being practiced in order to conserve resource base and maximize agricultural production. However 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 are believed to play significant role in improving land restoration practices and at least minimizing problems of land degradation are recommended.

- ✓ In association with the increased population pressure a number of adverse effects on the environmental conservation of the study area and land restoration practices have been identified. Easing population pressure on natural resource dependence needs due attention. This can be achieved by continuous training and awareness creation about the use of family planning, resettlement program, technological improvements in agriculture and development of other sectors of the economy to minimize burdens on natural resource.
- ✓ In making intervention in 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. The current land management practices mostly focus only soil and water conservation but require multidisciplinary and innovative land management approaches based on the local situation.
- ✓ To improve the productivity of the farmland focus should be given to intensive technique of agricultural system that promotes soil fertility improvement and conservation practices to boost production from small plot of land. In addition, farmers should be encouraged to put manures in farm fields rather than using it for fulfilling fuel wood demand.

- ✓ Land restoration practices in the study area can be further promoted if they are carried out in conjunction with other developmental activities like provision of family planning education and empowering women. The need for a flexible extension programme is necessary to broaden the concept of land restoration practices. It would be most timely and appropriate at the Federal level to produce guidelines that would take into account the priorities of regional and local level to enclose severely degraded areas from further degradation.
- ✓ They are taking the responsibility of the land under restoration by setting the rules to govern the process of restoration through local community organization.

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Annex I

Household survey questionnaire

Part I. general information

1. Name of the enumerator _____
2. Enumeration kebele _____
3. Date of the enumeration _____

Part II. Personal information

1. Name of respondent _____
2. Sex of the respondent 1, male ____ 2, female _____
3. Age of the respondent _____
4. Marital Status of the respondent 1, single 2, married 3, separated 4, widowed
5. Educational status of the respondent 1, illiterate__ 2, can read and write____ 3, grade 1-4____ 4, grade 5-8____ 5, grade 9-10____ 6, 10+1____ 7, 10+2 and above_____
6. Occupation 1, crop production 2, animal rearing 3, mixed farming 3, petty trading 5, mixed and petty trade 6, others (specify) _____
7. Family size Male _____ Female _____ Total _____

Part III Economic activities

1. What is your main economic activity? 1, Crop production 2, animal rearing
3. Mixed farming 4, petty trade 4, mixed farming and petty trade 5, others
(specify)
2. Do you have your own farm land? 1, yes 2, no
3. If your answer is 'yes', what is the estimated total size of your farmland? 1, less than
1 ha 2, 1-2 ha 3, 3-4 ha 4, above 4ha

4. How do you see your current landholding to support the household? 1. Insufficient 2. Sufficient 3.excess
5. If your answer is insufficient do you have any option of having additional land? 1, yes 2, no
6. If your answer is 'yes', what are the options? 1, share cropping 2, lease/contract land 3, clearing forest and grazing land 4, others (specify) _
7. How is the trend in your landholding size? 1, increasing 2, decreasing 3, no change 4, other (specify)
8. If your answer is 'increasing' what are the reasons behind the increment? (Multiple answers are possible) 1, encroachment into forest area 2, land reallocation 3, cultivation of marginal land 4, others (specify)
9. If your answer to Q No.7 above is 'decreasing', what are the root causes? (Multiple answers are possible) 1, increase in human population 2, increase in marginal land due to loss quality 3, land redistribution 4, land taken away by government 5, others (specify) _____
10. Do you think that the current land tenure system (land holding) is good to you? 1, yes 2, no
- 11 What is the reason for your response? _____
12. Do you think that land tenure security affects long-term investment on farm? Plot? Why?_____
13. What are the constraints to crop production in your area? (Multiple answers are possible) 1, Erratic rainfall 2, labor shortage 3, less access to input 4, drought 5. Land shortage 6 Soil erosion 7. Pest and disease 8.Others (specify)

14. Do you have your own livestock at present? 1, yes 2, no
15. If your answer is 'yes', what is the type and number of domestic animals you have?

Livestock type	Number
Cattle	
Ox	
Cow	
Calf	
Heifer	
Sheep	
Goat	
Equines	
Donkey	
Mule	
Horse	
Other (specify)	

16. What is the trend of your livestock holding? 1, increasing 2, decreasing 3, no change

17. If your answer is 'decreasing', what are the reasons (Multiple answers are possible) 1, Shortage of grazing land 2, Lack of money to buy animals 3, Prevalence of livestock disease 4, Others (specify) _____

18. If your answer is 'increasing', what are the reasons? _____

19. How do you feed your livestock? 1, free grazing on communal grazing land 2. Own grazing land 3, cut and carry from communal pasture land 4. Crop residue 5, others (specify) _____

20. How do you see the size of grazing land overtime? 1, increasing 2. Decreasing 3, remain the same

21. If your answer is 'decreasing', what are the reasons? (Multiple answers are Possible)
1, expansion of farm land 2, grazing land distribution among people 3, area closure
4, other (specify)

22 If your answer is 'increasing', what are the reasons? _____

Part IV Land degradation

23. Is there land degradation in your area? 1, yes 2, no
24. What were the major forms of land degradation in your area? (Multiple answers are possible) 1. Soil erosion by water 2. Soil erosion by wind 3. Deforestation 4. Overgrazing of range land 5. Gully formation 6. Others (specify)
25. Which type of erosion by running water is more common in your farm land? 1, sheet erosion 2, rill erosion 3, gully erosion 4, all form of erosion 5, others (specify)

26. In which season erosion is severe in your farm land? 1, summer 2, autumn 3, winter 4, spring
27. What were /are the immediate root causes of land degradation? (Multiple Answers are possible) 1, overstocking 2, cutting trees for fuel and construction 3, ploughing steep slopes 4, limited use of conservation structures 5, continued cultivation/no fallowing 6, others (specify)
28. What were/are the underlying root causes for land degradation in your area? (Multiple Answers are possible) 1, heavy rainfall 2, steep topography 3, population pressure 4, others (specify)
29. Is it possible to halt/minimize land degradation problem? 1, yes 2, no 3, I don't know
30. If your answer is 'yes', how? _____
31. If your answer is 'no', why? _____

Part V Land restoration practices

32. Is there land restoration practices in your area? 1, yes 2, no
33. If your answer is 'yes', what are the main land restoration practices? 1, area closure 2, soil and water conservation 3, agro-forestry 4, others (specify)
34. If there is area closure in your area, do you support it? 1, yes 2, no

35. If your answer is 'yes' or 'no' what are your reasons? _____
36. Was there any conflict aroused during area closure? 1, yes 2, no
37. If your answer is 'yes', how it was resolved? _____
38. Which season is preferable to practice different conservation activities? (Summer, autumn, winter, spring)Area
closure_____
- Soil water conservation structures_____
- Agro-forestry_____
39. Which conservation measures listed in question no 33 do you think are more effective in restoration degraded lands? Why?

40. What mechanisms did you used to maintain soil fertility in your farmland? 1, Chemical fertilizer 2, Crop rotation 3, Manu ring 4, Fallowing
41. What were the SWC structures you had used in your area? 1. Contour ploughing 2. Stone bunds 3.Terraces 4. Ditches 5, Forage strips 6. Others (specify

42. What mechanisms did you use for gully treatment? 1. check-dam 2, cut off drains 3. Planting trees legumes and grasses 4. Others (specify)

43. How do you see land restoration practices over time? 1, increasing 2, decreasing 3, no change 4, unknown
44. If your answer is 'increasing'/'decreasing', what are the reasons? _____
45. How is your participation in land management practice over time? 1, high 2, medium 3, low 4, I didn't participated
46. What are the reasons for your answer? _____

47. With the increase in the size of the population how do you see the involvement of the society in land restoration practice? 1, increasing 2, decreasing 3, remain the same
48. If your answer is 'increasing', what are the reasons? _____
49. If your answer is 'decreasing', what are the reasons? _____
50. Are your house hold members willing/have motive to involve in Land Restoration practices? 1, Yes 2, No
51. If your answer is no what is the reason? _____
52. How do you see the assistance gained from other households for land restoration practice? 1, increasing 2, decreasing 3, remain the same
53. How do you see the productivity of the farm land overtime? 1. Increasing 2. Decreasing 3. No change 4. I don't know
54. If your answer is 'decreasing', what are the reasons? (Multiple answers Possible) 1. Decrease in rainfall 2. Decrease in farm size 3, decrease in soil fertility 4. Others (specify)
55. If your answer 'increasing', what are the reasons? 1. Access to new land 2. Better land management 3. Benefit from agricultural extension technologies 4. Adequate rainfall 5. Others (specify) _____
56. Does any member of your family involve in off-farm activities? 1, Yes 2, No
57. If your answer is yes, in what type of type of work are they involved? 1, handicraft 2, laborer 3, petty trading 4, government employer 5, others (specify)
58. Do you see any influence of off -farm activities on land restoration practices? 1, Yes 2, No
59. If your answer is 'yes 'in what way they could influence the practice? ___

60. What do you think about the benefits obtained from land restoration practices?

61. Is there improvement in natural resource management in your area? 1, yes 2, no

62. If your answer is 'yes', list down the changes observed. _____

63. List any socio- economic factors that hinders you from participating in Land restoration practices _____

64. Have you access to any extension programs to improve resource conservation practices in your area? 1, Yes 2. No

65. If your answer is 'yes', have you applied any in the recent past? 1. Yes 2. No

66. If your answer is 'yes', what did you get?

List its benefits _____

List its weakness _____

67. If your answer is 'no', what is the reason? _____

68. Where do you get information about land management? 1. Traditionally 2. From neighbors 3. From DAs 4. From NGOs 5. Other (specify)

69. Is there any effort made by Woreda Agriculture and Rural Development Office to promote local conservation practices? 1. Yes 2. No

70. If your answer is yes, mention those efforts. _____

71. Is there intervention by NGOs to restoration efforts degraded lands in your area? 1, Yes 2, No

72. If your answer is 'yes' what are their contribution to restoration degraded lands?

73. List down any policy related factors that you think are obstacles to the Restoration practice in your area

74. What measures do you suggest for the sustainability of land restoration practices in your area?

Annex II Questionnaire for key informant interview

1. What is the average landholding of households? Is the current holding sufficient to feed the family?
2. What is the trend of land holding size over a period of time and what are the reasons?
3. What is the nature of land degradation in the area?
4. What rights do farmers currently have on their land holding?
5. Do you think that this right affects farmers land management activities?
6. If there is a problem of land degradation, what are the indicators?
7. What are the contributing factors for land degradation?
8. What is the trend of productivity of land through time? Give justification for your response
9. What is the trend of livestock holding by the farmers in the area? Give reasons for your response
10. Describe the major feed sources for livestock by order of importance
11. What is the trend of these livestock feed? Give reasons for your response
10. How did you see land restoration practice carried out in your area in the past?
11. What is the situation of the practice nowadays?

12. What interventions are there by government and NGOs in the area with regard to land restoration practice?

13. What are the constraints to the sustainability of land restoration practices in your area?

a. Policy/institutional _____

b. Socio-cultural _____

c. Economic _____

14. What measures do you suggest for the restoration of degraded land in effective manner?

Annex III Checklist for focus groups discussions

1. What are the major economic activities of the community?

2. What challenges are there in undertaking these economic activities?

3. What is the trend of households' landholding size overtime?

4. What are the contributing factors if there is any change?

5. How do you describe the productivity of land overtime?

6. If there are changes, what are the contributing factors?

7. What mechanisms are used by the farmers to improve the productivity of land?

8. Do you think that current land security system is good to invest in long-term benefits in your farmland?

9. What challenges are there in using these mechanisms?

10. What are the major livestock feed in the area?

11. What is the trend in the availability of livestock feed?

12. If there is change, what are the major causes?

13. What is the trend in livestock holding by the community in the area?
14. What challenges are there in livestock production? If there are challenges, what are the causes?
15. How do you describe the status of land degradation in your kebele?
16. If there are problems of land degradation, what are the indicators for the problems?
17. What are the causes for land degradation?
18. What factors are aggravating the problems?
19. How did you see land restoration practice carried out in your area in the past?
20. How is the practice nowadays?
21. What problems being encounters in relation to land restoration practices?
22. What should be done to promote and sustain natural resource conservation in effective manner in your area?

Annex IV Livestock holding and sources of feed in the study area of the sample households.

Livestock holding and sources of feed in the study area of the sample households	Amiburise A.		Tikare A.	
	Frequency	%	Frequency	%
Do you have livestock				
Yes	63	96.9	51	98.1
No	2	3.1	1	1.9
Size of different livestock	Maximum	Mean	Maximum	Mean
Cattle	6	1.2	7	1.7
	Minimum		Minimum	
	1		0	
Goat	Maximum	Mean	Maximum	Mean
	4	0.6	5	0.5
	Minimum		Minimum	
	1		1	

Sheep	Maximum 7	Mean 2.3	Maximum 6	Mean 2.1
	Minimum 1		Minimum 2	
Equines	Maximum 3	Mean 0.4	Maximum 1	Mean 0.3
	Minimum 0		Minimum 0	
Trend in livestock holding				
Increasing	12	14.3	19	37.3
Decreasing	45	71.4	33	64.7
No change	8	12.7	—	—
Reasons for decreasing livestock holding				
Shortage of grazing land	39	86.6	23	69.7
Lack of money to buy animals	27	60	16	48.5
Prevalence of diseases	11	24.4	12	36.4
Livestock feed sources.				
Communal grazing land	45	71.4	20	39.2
Own grazing land	35	55.5	25	49.1
Cut and carry system from communal land	36	57.2	9	17.6
Crop residue	45	71.4	22	43.2
Trend in grazing land over time.				
Increasing	—	—	1	1.9
Decreasing	60	95.3	49	96.1
Remain the same	3	4.7	1	1.9
Reasons for decreasing of grazing land				
Farm land expansion	43	71.6	36	73.5
Grazing land distribution for cultivation	31	51.6	22	44.9
Closing severely degraded grazing area for restoration purpose	15	25	5	10.2

Source: field survey (January 2014)

Declaration

First, I declare that this thesis is my bona side work and that all sources of materials used for the thesis have been duly acknowledged. I solemnly declare that this thesis has never been presented to any other institution anywhere for the ward of any academic degree, diploma, or certificate.

Name: Addise Ermias Batisa

Signature: _____