

**ADDIS ABEBA UNIVERSITY**

*Addis Ababa  
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**COLLEGE OF DEVELOPMENT STUDIES**

**CENTER FOR ENVIRONMENT AND DEVELOPMENT STUDIES**

**SUSTAINABLE LAND MANAGEMENT PRACTICES AND  
ENVIRONMENTAL DISASTER RISK IN QUARIT WEREDA, AMHARA  
REGION, ETHIOPIA**

**BY**

**BETIGIST SIMACHEW**

**OCTOBER, 2020**

**ADDIS ABEBA, ETHIOPIA**

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MA THESIS SUBMITTED TO CENTER FOR ENVIRONMENT AND DEVELOPMENT  
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## DECLARATION

I declare that this thesis is submitted for the partial fulfillment of the degree of Master of Art in Environment and Sustainable Development. It is my original work and has not been presented for an award of a degree in any other university.

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This is to certify that the thesis prepared by Betigist Simachew Entitled: Sustainable land management practice and environmental disaster risk in Quarit, Amhara region, Ethiopia submitted in partial fulfillment of the requirements for the Degree of Masters of Arts (In Environment and Sustainable Development) complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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## **Acronyms**

ADLI	Agricultural Development Led-Industrialization
CRGE	Climate Resilience Green Economy
CSA	Central Statistical Agency of Ethiopia
DAs	Development agents
DRR	Disaster Risk Reduction
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
GTP	Growth and Transformation Plan
HFA	Hyogo Framework for Action
HHs	Households
KII	Key Informant Interview
MoFED	Ministry of Finance and Economic Development
NGOs	None Governmental Organizations
NRC	Natural resource conservation
PASDEP	Plan Accelerated and Sustained Development to End Poverty
SLM	Sustainable land management
SWC	Soil and water conservation
TLU	Tropical Livestock Units
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

## **Abstract**

*Land degradation associated to mismanagement and utilization of natural resources is among concerning challenge in developing countries including Ethiopia. In response to the challenge, Ethiopian government and its partners have been implementing different land management practices; however the role of the practice was not sufficiently researched. Therefore this paper assessed the role of sustainable land management (SLM) practices for reducing land degradation in Quarit wereda, Amhara region, Ethiopia. Mixed research design method was employed to collect quantitative data from randomly selected 150 HHs and qualitative data in two purposefully selected rural kebeles, where descriptive statistics was used to analyze the quantitative data. The analysis revealed that the most (75%) survey households have been implementing SLMP on croplands varying from on 93.6% barley cultivated farmlands to 32.7% on vegetable farms. The major SLM practices adopted by study community include stone bund (26%), soil bund (39%), strip cropping (75%) and contour farming (87%). Nevertheless, as the study community largely depend on livestock production, the sector depend on crop residues and very scarce and poorly managed communal grazing lands, which tells that the livestock has been creating considerable effect on sustainable land management. The study community also acknowledged the significance of SLM practices as it to minimize land degradation by reduced soil erosion (86.7%), increasing water holding capacity of soil (63%), improve soil fertility (59%), increased agricultural productivity (55%), reducing land degradation (34%), flooding (24%) and land slide (22%). Most of the respondent households (94%) reported that nature of landform was key factor that influence their decision to implement SLM. From theses we can learn that adoption of SLM practice have been improving over time, however more promotion and extension required until the entire farming community understood significance of the practices and implement it wherever required.*

**Key words:** *land, land management, land degradation, soil erosion, sustainable land management*

# Table of Contents

# Pages

Acknowledgement .....	ii
Acronyms .....	iii
Abstract .....	iv
Contents .....	v
List of Tables .....	vii
List of Figures .....	viii
CHAPTER ONE .....	1
1. Introduction.....	1
1.1. Background of the study .....	1
1.2. Statement of the problem .....	3
1.2.1. General objective .....	5
1.2.2. Specific objectives .....	5
1.3. Research questions.....	5
1.4. Scope of the study .....	5
1.5. Significance of the study .....	5
1.6. Limitation of the study.....	6
1.7. Organization of the thesis .....	6
CHAPTERTWO .....	7
2. Literature Review.....	7
2.1. Definitions and Concepts.....	7
2.3. Roles of sustainable land management in Ethiopia.....	8
2.4. Factors that affect the implementation of SLM .....	9
2.6. Sustainable land management and environmental disaster risk .....	11
2.7. Conceptual framework.....	12
CHAPTER THREE .....	14
3. Research Methodology .....	14
3.1. Description of the study area .....	14
3.1.1. Location and climate.....	14
3.2. Research method.....	15
3.2.1. Research design.....	16
3.2.2. Sampling design.....	16

3.2.3. Sample size determination and sampling technique .....	16
3.2.4. Tools and techniques of data collection .....	17
3.2.5. Data analysis .....	19
3.2.6. Ethical consideration.....	20
CHAPTER FOUR.....	21
4. Results and discussion .....	21
4.1. Demographic and Socio-economic Characteristics of the Respondents.....	21
4.1.1. Age, sex, marital status and family size of the respondents.....	21
4.1.2. Educational Level .....	23
4.1.3. Economic activities .....	24
4.2. Common sustainable land management practices of the study area.....	28
4.2.1. Anticipated roles of SLM practices.....	29
4.3. Occurrence of land degradation in the study area.....	32
4.4. Factors affecting implementation of sustainable land management practice.....	32
4.4.1. Topographic nature as factor for implementation of SLM practice.....	34
4.4.2. Livestock holding as factor for SLM practice.....	35
4.4.4. Extension services and land tenure .....	36
CHAPTER FIVE .....	38
5. Conclusion and Recommendation .....	38
5.1. Conclusion .....	38
5.2. Recommendation .....	39
References.....	40
APPENDICES .....	46

## **List of Tables**

Table 1: Proportionate number of Sample by Kebele.....	17
Table 2: Respondents sex, marital status and family size.....	22
Table 3: Respondents education level association with their SLM practices.....	24
Table 4: Survey household’s major economic activities .....	24
Table 5: Major cultivated crop types by HHs and SLM practices by crop type.....	26
Table 6: Livestock holdings of survey households.....	27
Table 7: Agricultural land holding of survey households.....	28
Table 8: Common SLM practices in the study area.....	29
Table 9: Benefits of SLM practices for reducing environmental disaster risk .....	30
Table 10: Farmer’s perception on land degradation at their localities.....	32
Table 11: Extension service as factor of SLM practice .....	33
Table 12: Nature of land forms where farmers implement SLM.....	34
Table 13: Livestock holding as factor for SLM practices.....	36
Table 14: Extension contact.....	37

## **List of Figures**

Figure 1: Conceptual framework of the study .....	13
Figure 2: Location map of the study area .....	15
Figure 3: FGD participants of Deneja Tision and Enangia Shime kebeles.....	19
Figure 4: Stone check dam constructed to protect gully erosions.....	31

# CHAPTER ONE

## 1. Introduction

### 1.1. Background of the study

Agricultural sector is a fundamental instrument for poverty alleviation, food security and economic growth in Ethiopian economy (Kassie et al., 2010). In any agricultural production system, land is one of fundamental and limited natural resources that requests effective management for sustainable production (Steinet *et al.*, 2009). Land is also very important element for all living things of the planet in one way or another. Land helps human beings to produce basic needs and service like: food, clothing and shelter, and also the principal resource of human beings in general and agrarian society in particular. For any nation land is crown resource and means of wealth (Kifle, 2016). Depending on natural factors like climate, relief and soil fertility and manmade factor such as level of technology and use of land resources, the productivity of land vary spatially (Tola, 2015). However, this recourse has been misused, getting degrading and environmental disaster risks facing critical challenge to deliver required service in sustainable way, where the problem is very acute in developing countries including Ethiopia.

According to (Aerts et al., 2018), disaster risk is a combination of natural hazards, along with society's exposure and vulnerability to them. as a result, to ensure effective, long-term disaster risk reduction we must consider the dynamics of each of these components and how they change over extended periods due to population, economic and climatic drivers, as well as policy and individual decisions. Disaster Risk Reduction (DRR) is a strategic amplification engaged for forecasting future disaster risk, compressing current vulnerability, and enhancing flexibility or resilience (Forino et al., 2017). It is a procedure of methodical undertaking to clarify and handle the noteworthy components of disasters, like reduced exposure to hazards, intelligent management of the physical and environmental sector, reduce the vulnerability of resources and people, and improve preparedness for harmful events (Schipper and Pelling, 2006). DRR is more concerned with preventive measures and activities before a disaster. It is a careful mix of policies, measures, and practices to reduce the impact or mitigate the effect of the occurrence of a disaster on the community, society, and environment, (Mojtahedi, 2017). In summary, DRR is built up of two key components in approach and action with regards to effectively reducing

hazard risk and mitigating loss of life, damage to property, environmental damage as well as enhancing early disaster response and preparedness ( Klima and Jerolleman,2017)

Therefore adoption and investment in sustainable land management is crucial in reversing and controlling land degradation, rehabilitating degraded lands and ensuring the optimal use of land resource for the benefit of present and future generations (Kirui, 2017).Land management is encompassing all activities associated with the management of land that are required to achieve sustainable development (Eshetia, 2018).

The rural population in developing countries, like in Ethiopia, is especially highly dependent on agriculture which provide basic commodities, as problem of land degradation and sustainable use of the natural resource wide and deep in the country, over the last three decades, donors and government of Ethiopia have undertaken various plans for natural resource conservation to reduce environmental degradation, and agricultural productivity so as to improve food security and reduce poverty in general. Although, government and its partners have been working to improve natural resources conservation through introduction and promotion of sustainable land management (SLM) practices, the rate of adoption is still very low (Kassie et al., 2010).

In order to improve the situation the government Ethiopian formulated and implemented various strategic and policy actions for sustainable land management on public and private lands. Of these policy and strategic measures of the government that directly or indirectly address the issue of SLM practices include: Plan Accelerated and Sustained Development to End Poverty/PASDEP (MoFED (2007, p 61 -63), Growth and Transformation Plan/GTP I (MoFED, 2010; National Planning Commission 2016, p123-124), Climate Resilience Green Economy (CRGE, 2011), and the recent rural land administration and use proclamation (Negarit Gazeta, No. 456/2005). These plans, strategies and rules aimed at promoting and encouraging plan and investment on SLM and climate-smart agricultural practices. The plans, policies and strategies take into account the unique conditions of different agro-ecological zones with a goal of augmenting agricultural production and reducing climate change and human induced production risks. Furthermore, Agricultural Development Led-Industrialization (ADLI) is national development strategy devised to enhance the role of agriculture as the engine of national economic growth. Through ADLI, the country plans for rapid and sustainable economic growth

and independence from foreign food aid, ensuring maximum benefit for the local population in the context of a free, open market and enhanced SLM (Gebre-Selassie and Bekele, 2012).

In connection to this, Ethiopian government and partners organizations and agencies have been implementing different SLM practices including soil and water conservation measures over the last four decades. However, the improvement still lagging behind as compared to the investment through community mobilization and paid labor. For instance, the most important element to maintain land resources status is forest, however, the forests recourse have been deteriorating to meet the need for household energy and to expand cultivated lands. In fact over the past decades, there have been a forestation program to increase forest cover of the country, however, the rate of deforestation and a forestation is not equivalent, where the rate of deforestation is much greater than a forestation (Taye, 2006). This situation led to loss of soil through accelerated erosion and thereby resulted in poor performances of agricultural production and yields have declined and stagnated over years and continued environmental risks (Taye, 2006). This study, therefore, investigated the extent of sustainable land management practices played a vital for environmental disaster risk reduction.

## **1.2. Statement of the problem**

Recently a growing consequence of land degradation, rising population pressure and low productivity of agriculture, Ethiopia has progressively more dependent on food aid (Kassie et al., 2010). Particularly land degradation in the forms of soil erosion is severe problem to agricultural productivity and economic growth in Ethiopia (Lemenih, 2005).

Over cultivation, deficient and poor irrigation practices lead to land degradation (Tola, 2015). Deforestation and land degradation is considered as the most important challenging issues in Ethiopia (Teketay, 2001). In addition to the stated causes of land degradation studies have identified that population pressure, unsustainable agricultural practices, overgrazing, climatic shocks, insufficient tenure security, inadequate soil conservation practices, and poverty, high costs or limited access of farmers to fertilizers, fuel and animal feed, limited or lack of farmer access to credit and underdeveloped markets as a major causes of land degradation in Ethiopia (World Bank, 2005).

Rural poor people depends on subsistence agriculture, they depend directly on outcomes for their survival. This has deep implication for the security of their livelihoods and for their welfare. With climate change, the magnitude and frequency of stresses and shocks is changing and approaches such as social protection, disaster risk reduction and climate change adaptation are needed to bolster local resilience and supplement people's experience (Davies et al., 2009).

In the study area the dependence of people's livelihoods on agriculture and inappropriate use of natural resources resulted in rapid and enormous land degradation (Hurni, 1993). Floods, drought, desertification, drying of streams, and soil erosion are connected with the process of forest exploitation and destruction (Teketay, 2001). Floods are expected to increase because of the combination of climate change and natural resources degradation (Collins et al., 2014; Blöschl et al., 2015). Likewise, some empirical evidences revealed that development of agricultural sector largely depends on land productivity. The magnitude of the severity of erosion over 50% of the highlands are significantly eroded, while 25% is seriously eroded (Hurni, 1993).

In connection to this, local government and stakeholders have been implementing different SLM practices over the last four decades. Different studies were conducted related to SLM such as Kifle, 2016; Eshetia, 2018; Motuma (2017); Micheal (2002), (Eshetia,2018) and Mamuye (2015). These researchers generally focus on assessing what land management practices look like, assesses the benefits of farmer after implementing SLM practices in erosion-prone areas, assess the significant reduction in soil erosion due to sustainable land management practices and soil and water conservation measure and assessing the traditional land management practices in their study area. As to the researcher's knowledge, there is a research gap on the issue related with an assessment of the role of sustainable land management practices for reducing land degradation. On the other hand, the methodology they used to conduct their research was cross-sectional research design. Hence this study assesses sustainable land management practices and environmental disaster risk in Quarit wereda, Amhara region, Ethiopia.

## **Objectives of the study**

### **1.2.1. General objective**

The general objective of the study is to assess sustainable land management practice and environmental disaster risk in Quarit Wereda, Amhara region Ethiopia.

### **1.2.2. Specific objectives**

More specifically this study targeted to:

- ❖ assess the environmental disaster risk occurring in the study area
- ❖ identify sustainable land management practices in the study area
- ❖ analyze factors affecting implementation of sustainable land management practices

### **1.3. Research questions**

The study was attempted to answer the following questions:

1. How environmental disaster risk occurred in the study area?
2. What sustainable land management practices are conducted in the study area?
3. What factors that affect implementation of sustainable land management practices in the study area?

### **1.4. Scope of the study**

This study was focused on sustainable land management and environmental disaster risk. The study emphasized on identifying sustainable land management practices, it also try to identify sustainable land management and It also assessed factors affecting the implementation of sustainable land management in the area. Accordingly, the study was bounded thematically, spatially, methodologically and target population. Thematically, the study focused on sustainable land management practices and land degradation. Spatially, the study was conducted in Quarit Wereda of West Gojjam Zone, Amhara Region, Ethiopia. The study population was total population of Quarit Wereda, while the target population was total households of Deneja Tsiyon and Enangia Shime Kebeles from which the sample population was drawn.

### **1.5. Significance of the study**

The study is to identify sustainable land management practices and environmental disaster risks in the study area. Likewise, many other local areas in Ethiopia, Quarit Wereda in Amhara

Region, faces land degradation and environmental disaster risks. Therefore, the finding of this study will have number of significances to readers, development practitioners and policy makers. It also helps readers to understand sustainable land management and environmental disaster risk reduction. Moreover, it can assist development practitioners to understand the role of sustainable land management lead incentive in improving land productivity and agriculture production, and helps to protect the environment and environmental disaster risk. The finding of the research might also inform to policy makers in the effort to prove knowledge based legislative and strategic solution for environmental disaster risk reduction. The output of the study might also use as entry point to conduct further research and studies on sustainable land management.

### **1.6. Limitation of the study**

There were limitations during the research work which have a considerable influence on the study results: s, there was also lack of organized secondary data. In addition, there were unexpected restrictions due to COVID-19 pandemic to conduct the research. While, the researcher was deals with the kebele administrator and respondents about the purpose of the survey and give the solution to the limitation to work freely and timely. It was focused on data completeness of questionnaire survey through employing development agents to make data collection friendly.

### **1.7. Organization of the thesis**

This thesis report contained five chapters that begin with introductory part that include background and the problem statement in the first chapter. The second section presented a review of literatures on basic concepts, theoretical frameworks and empirical evidences on sustainable land management practices and environmental disaster risk. Chapter three confers materials and methods, while chapter four provided results and discussion and the last chapter presented conclusions and recommendation.

## CHAPTER TWO

### 2. Literature Review

#### 2.1. Definitions and Concepts

**Land:** refers to natural resources, such as soils, water, and living organisms (Hurni, 2000).

**Land Degradation:** defined as long-term loss of ecosystem function and productivity caused by disturbances from which land cannot recover unaided (Bai et. al., 2008). Land degradation is also one of the most catastrophic outcomes of long-lasting drought events and anthropogenic activities (Mariano, 2018).

**Deforestation:** are clearance of forests and woodlands for cultivating crops and the cutting of trees and undergrowth for various purposes, notably for fuel wood, charcoal, construction materials, etc. (Taddese, 2001).

**Land management** – It encompass all activities associated with the management of land that are required to achieve sustainable development (Eshetia, 2018).

#### 2.2. Sustainable Land Management (SLM)

The concept of sustainability was given added stimulus at the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992. Chapter 10 of Agenda 21 is concerned with the planning and management of land resources. For these reasons sustainable land management (SLM) is now receiving considerable attention from development experts, policy makers, researchers and educator's perspective (Mitiku, et. al, 2006).

SLM practices encompass management of the soil, water and vegetation to enhance long-term productive potential of the resources, maintenance of their environmental functions. SLM aimed at simultaneously manage the major land resources such as soils, water, animals and plants in the process of goods and services production to meet increasing and changing human needs (Motavalli et al., 2013). Schwilch et al. (2014) clearly indicated that sustainable land management has a great role in order to improving natural resources while being economically viable and socially acceptable.

SLM is basic to achieve the changes in land management to address land degradation and desertification that can simultaneously reduce net greenhouse gas emissions and contribute to conservation of biodiversity (Cowie et al., 2011). Land degradation as a result of the poor management of land resource, it is a serious global difficulty that leads to losses in food production and thus jeopardizes food security worldwide particularly in most parts of developing countries (Nigussie et al., 2017).

### **2.3. Roles of sustainable land management in Ethiopia**

Sustainable land management have a great role in order to improving the productivity and protection of natural resources while being economically viable and socially acceptable through encompasses soil, water and vegetation conservation measures (Schwilch et al., 2014). Sustainable land management is long-term productive potential of the resources and the maintenance of their environmental functions, and simultaneously ensuring the land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, (Motavalli et al., 2013).

Sustainable land management is an important issue and receives emphasis in the country's development agenda. SLM in Ethiopia aims to reverse land degradation, improve agricultural productivity and achieve food security through implementing large scale soil and water conservation practices (Snyder et al., 2014). In this regard, development projects and programs have been implemented by successive Ethiopian governments in collaboration with several consortia of donors since the 1970s (Snyder et al., 2014; Teshome et al., 2016). In accordance with the principles and concepts of sustainable land management natural resources can potentially be used in a sustainable way if appropriate land management technology, regional planning and the policy framework complement one another in a purposeful way (Tola, 2015).

Due to complex and rugged topography as well as high rainfall over short period of time, sustainable land management practices are important in the highlands of Ethiopia that support over 75% of the population so as to increase land productivity and improve food security. In line with this, over the last three decades, natural resource conservation interventions carried out in the highlands to reduce environmental degradation, poverty and increase agricultural productivity and food security. The SLM and natural resource conservation in the highlands of the country have been under implementation by the government of Ethiopia in association with

donors. However, diverse empirical evidences are indicating that the adoption and adaptation rate of sustainable land management practices is low (Kasse et al., 2010).

The most common SLM and natural resource conservation (NRC) practices in Ethiopia since the early 1970's to date include a range of physical soil and water conservation (SWC) measures, such as stone/soil bunds, farmland and hillside terracing and check-dams, gully rehabilitation cut-off drains and waterways, micro-basins water harvesting structures like ponds and farm dams, spring development, as well as biological measures, such as tree planting at homestead and on farm (agro-forestry trees) reforestation, area enclosures and management (Dale, 2010; Damene et al., 2013).

The purpose of sustainable land management practices is to reduce soil erosion by implementing physical SWC structures and enhance soil fertility by improving surface cover using biological measures and agronomic practices such as, crop rotation, fallowing, intercropping, applying animal/green manure, and composting and also, reduce water losses through water harvesting infiltration and storage, improving irrigation, and managing surplus water (Dallimer, 2018). The use of vegetative and structural barriers, helping to reduce erosion can catch sediments and nutrients. Through the use of windbreaks, shelterbelts, and trees for shade (via agro forestry and multistory cropping to manage the microclimatic conditions (Liniger et al., 2011).

The SLM practices also helps to reduce severity of land degradation, increase crop diversity, promote higher yields, lower the costs of production, improve the micro-climate for plants, and preserve organic carbon in the soil, among other things, that enhance the productivity of the land, while helping to adapt to climate changes and mitigate climate change through Sustainable land management practices (Recha et al., 2014).

#### **2.4. Factors that affect the implementation of SLM**

It constitutes the fundamental base of rural livelihoods. However, its sustainable use is highly affected (among other factors) by bio-physical and institutional aspects of land such as land quality, land fragmentation and tenure systems (Teshome et al., 2016). Population growth, increasing income, urbanization, infrastructure development, food price and price elasticity of demand, policies at national and international level, land tenure and property rights, bio-energy and land degradation are factors that changes land use. These factors may be classified as natural

and anthropogenic factors. However, it is complex to distinguish and put anthropogenic and natural factors. For example, population growth is a natural phenomenon, although, it motivates the people to practice deforestation, and extra factor that probable to affect land use management on one way or another (Tola, 2015).

Significant factors consist of access to information (education and extension), access to both input and output markets, social, human and physical capital endowments, credit availability, the profitability of the management technology, and property rights that affect sustainable land management (Kirui, 2017). Plot level characteristics such as soil fertility status, slope of plots, and location of the plot influence the continued use of sustainable land management practices as well as ,availability of labor force, land holding, crop production, and farm input utilization were found to have an influence sustainable land management practices (Teshome et al., 2016).

## **2.5. Environmental disaster risk**

Disaster is a harsh disruption of the functioning of a community that happened as a result of high level of community vulnerability to hazard and low level of capacity to cope with the potential negative consequences. Death, injuries, disease and adverse effects on humans' physical, mental and social well-being are some of the negative impacts of disasters. Disasters can be small or large-scale, frequent or infrequent and rapid beginning (e.g. flash flood) or slow-onset (drought, desertification, epidemic disease, sea-level rise) (UNISDR, 2009).

On the other hand, disaster risks are future disasters anticipated through generating risk information and imagination of the nature of hazards together with vulnerability and capacity conditions of elements at risk. It is the potential disaster loss in lives, health status, livelihoods, assets and services which could occur to a particular community or society over some specified future time period. It reflects the concept of disasters as the outcome of continuously present conditions of risk. It comprises different types of potential losses which are often difficult to quantify. Nevertheless, with knowledge of the prevailing hazards and the patterns of population and socio-economic development, disaster risks can be assessed and mapped. Therefore, risk information is the base for disaster risk reduction (HFA, 2005).

Disaster risk reduction is a tool that verifies the degree of risk and describes and measures to increase capacities and reduce hazard impact on the elements at risk so that disaster will be

avoided. It is also a practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment and improved preparedness for adverse events. It provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks through prevention, mitigation and preparedness. Recently, the risk reduction concept is an accepted trend and supported by literatures and reports that accelerated shift from emergency response to disaster risk reduction in different countries in a way to build a resilient nation (HFA, 2005 and Shaw *et al.*, 2013).

Disaster risk reduction is reducing exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events all the way through systematic efforts to analyses and manage the causal factors of disasters (Nedessa and Wickrema, 2010).

## **2.6. Sustainable land management and environmental disaster risk**

Sustainable land management is important for two mutually dependent reasons: land provides the base of production, in terms of food, fiber, wood, and other natural products, required by the evolving needs of populations and ensuring sustainable development without compromising the future. SLM is fundamental for minimizing hazards and ensuring a hospitable environment for humans and other living organisms, by combating land degradation. Growing population pressure has strongly influenced the farming systems and land management in Africa, Asia, and Latin America. Because of the ever increasing pressure on available land, shifting cultivation is disappearing, cultivation periods become longer while fallow periods are reduced in time. As a consequence, agricultural inputs increase while yields of the traditional systems decrease. In such agriculture, labor productivity remains high, unless yields decline (Syers *et al.*, 1996).

Tefera and Sterk, (2010) stated that various practices, such as the construction of soil or stone bunds, a terrace system (like bench terraces and trenches), cut-off drains, drainage canals, and check dams, planting of different shrub or tree species and establishing area enclosures are promoted by sustainable land management program. Further to these, other practices such as combinations of structural and vegetative measures and reduction of household livestock numbers have been recently introduced as promising measures to control soil erosion and achieve sustainable ecosystem services.

SLM practices investigated on croplands, soil bunds reinforced with grass performed best in controlling soil loss, indicating the effectiveness of integrating structural and vegetative measures to control soil erosion from cultivated lands. Vegetation restoration is therefore considered one of the best SLM practices for improving protective capacity against soil erosion. However, further investigation is needed in consideration of ecological succession and other possible effects such as integrated measures might have, for example, effects on soil properties, biomass, and biodiversity (Ebabu et al., 2019).

## **2.7. Conceptual framework**

SLM is crucial to minimize land degradation, rehabilitating degraded areas, and ensuring the optimal use of land resources for the benefit of present and future generations (Liniger et al., 2011). Sustainable land management is an acknowledged procedure that helps to integrate land, water, biodiversity and environmental management including input and output externalities to meet rising food and fiber demands while sustaining ecosystem services and livelihoods (Weith et al., 2013). World Bank (2008) report indicated that SLM is necessary to meet the requirements of a growing population and improper land management which can lead to degradation of land in a significant reduction in the production and service functions. Unsustainable land management practice can threaten biodiversity and increase the release of carbon especially through the destruction of the forest as well as impacting adversely on water resource management. On the other hand, they present the opportunities for enhancing the livelihoods of the poor or fostering inclusive growth as well as for achieving environmental goals (FAO, 2011).

As modified from FAO (2011), adopting SLM practice contributes to the mitigation of climate change by sequestering atmospheric carbon in the soil and in the perennial vegetation through the help of technology including afforestation, agroforestry, reduced tillage, improved grazing land management, greenhouse emissions can also be reduced by limiting deforestation, reducing the use of fire, better livestock management, and better agro-economic practices. Practices to be truly sustainable must be environmentally friendly, reduce current land degradation, improve biodiversity and increase resilience to climate variation and change. SLM interventions are vital to prevent, mitigate and rehabilitate land degradation. The choice of SLM practice will be determined by the local context and particular situation for local stakeholders (FAO, 2011). In respect to this, some scholars expressed SLM as long-term investments including

construction of stone bunds, terraces planting of perennial trees and application of organic manures whose benefit last for more than two years. This study assumed that sustainable land management as long term land investment and those farmers will apply sustainable land management practices on farm plots. SLM also can reduce environmental disaster risk as shown in conceptual framework presented hereunder (Figure 1).

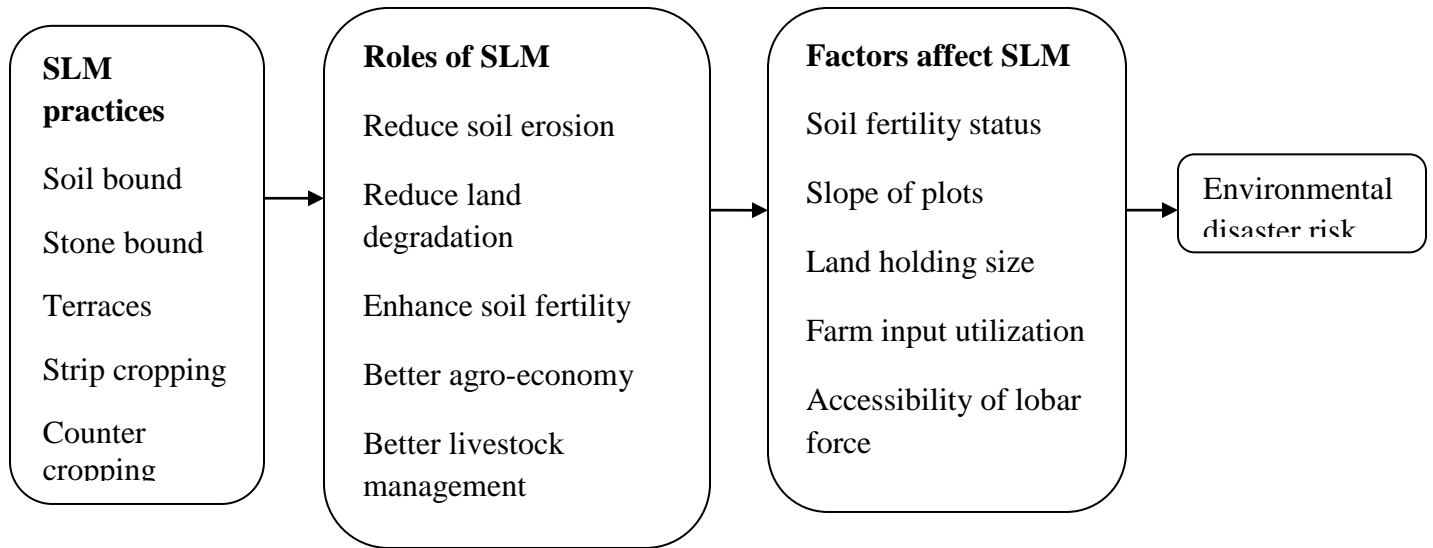


Figure 1: Conceptual framework of the study

Source: author, 2020

# CHAPTER THREE

## 3. Research Methodology

### 3.1. Description of the study area

#### 3.1.1. Location and climate

The study was conducted in Quarit wereda, west Gojjam zone of the Amhara national regional state. The wereda is bordered by Jabi Tehenan wereda in the southwest, Sekela wereda in the west, Yilmana Densa wereda in the north, East Gojjam zone in the east and Dega Damot wereda in the southeast. Geographically Quarit wereda extends from 10°45'00'' to 11°7'30'' North latitude and 37°18'30'' to 37°34'00'' East longitude (Figure 2) with altitudes ranging between 1861 and 3519 meter above mean sea level (m.a.s.l.) that extends from Birr River valley to the part of Chocke Mountain chain.

As per the local classification (Hurni, 1998) the wereda has two main agro-ecological zones, i.e., *Dega* (cool, humid highlands, 2300 to 3200 m a.s.l.) and *Wayna –dega* (mild and sub-humid highland climate with elevation of 1861 to 2300 m a.m.s.l.). Its average annual temperature ranges between 16°C and 25°C with an annual average rainfall of above 1000 mm (Yehenaw, 2019). Quarit wereda has 30 kebeles and the sample kebeles are Deneja Tsiyon and Enangia Shime which are located to the south of mount Amedamit part of Chocke Mountains. According to projection of 2007 national census data which was conducted by the Central Statistical Agency of Ethiopia (CSA, 2007) the total population of the wereda in 2019 was estimated to be 140,502 that based on growth rate (1.7%) of the Amhara region. Out of this, about 69,494 estimated to be male and 71,008 were female. In terms of residence location, about 4.1% are urban inhabitants. During the census time in (2007), the total households were 25,402 that resulting in a total of 24,927 housing units that yielded an average of 4.52 persons per household.

Majority of the wereda people means of livelihood and sources of income primarily depending on mixed agriculture, where they produce both crop and livestock. According Yehenaw (2019) referring to wereda Agricultural office report, the wereda has a typical rural set up with about 90% of population making their living from subsistent agriculture and allied activities. The total cultivable lands in the wereda are around 27,984 hectares. Crop production is the major agricultural activity where the main crops grown in order of area coverage include maize, teff,

wheat, barley, potato, horse beans and chick peas. In order of importance barley, wheat, potato, horse beans and chick peas are major crops in the *Dega* agro-ecology, while maize, teff, barley horse beans and chick peas dominate in *Wayna –dega* agro-ecology. These crops are largely rained. Livestock production is second key source of livelihoods. The major livestock’s types reared by farmers are: cattle, equines (donkeys, horses and mules), small ruminants (sheep and goats), chickens and honey bees (Yehehaw, 2019).

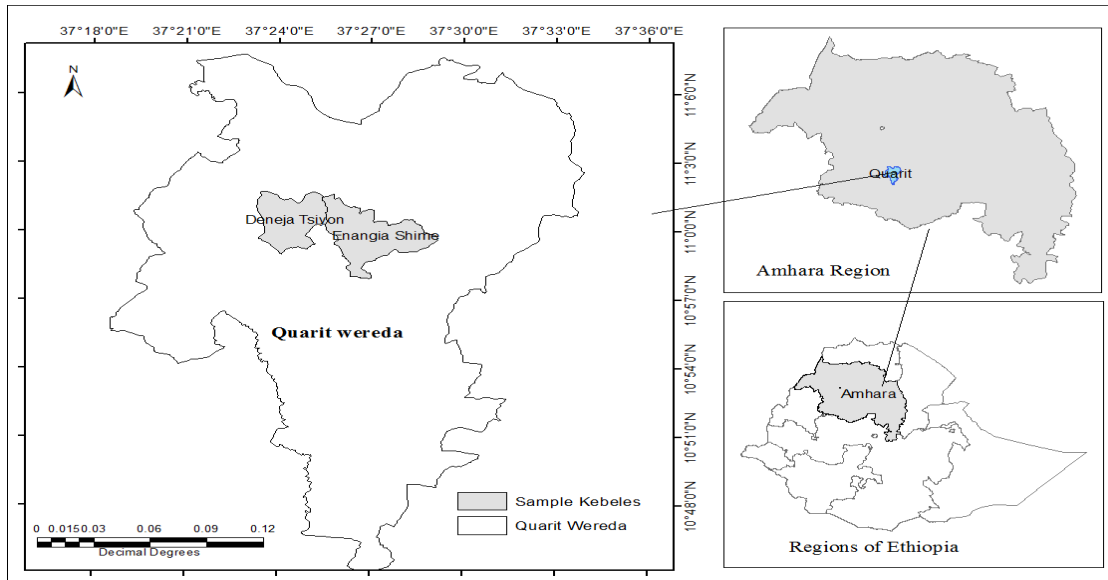


Figure 2: Location map of the study area

### 3.2. Research method

According to Leech and Onwuegbuzie (2006), an increasing number of researchers are utilizing mixed research methods to undertake their studies in order to draw meaningful results from both qualitative and quantitative types of data. Therefore, to find meaningful outcomes, the research applied mixed method that involved both quantitative and qualitative research approach to collect pertinent data. Qualitative approach is appropriate to study the selected issues in depth and to assess attitudes and opinions of the respondents were collected through interview and focus group discussion. It seeks a better understanding of complex situations and often descriptive in nature. Quantitative approach helps to generate extensive information (breadth) and provides results which can be condensed to statistics and was collected through semi structured questionnaire

### **3.2.1. Research design**

The study was used descriptive design with both qualitative and quantitative approaches to collect pertinent data and the data analyzed using descriptive statistics tools, which help to answers the questions of what and how. Accordingly, the study employed descriptive analysis method to make possible the role of sustainable land management practices for reducing land degradation.

### **3.2.2. Sampling design**

Sampling procedures involve multiple sampling stages. First, Quarit wereda was purposefully selected as considerable portion of the wereda has rugged topography that have been used for agricultural production and land degradation is prominent feature. Then, of the different rural kebeles, two of that can represent areas of land degradation were purposefully selected. The purposively selected kebeles were Deneja Tsiyon and Enangia Shime. Kebeles selection was based on established criteria's like location (which is a main cause for land management practices), agricultural productivity, and socio-economic (used to measure individual's, family's or a given area's economic and social position in relation to others, based on income, education, and occupation); the two kebeles have different topography Enangia Shime have flat and undulating and Deneja Tsiyon have undulating and steep which are most suit to study the role of sustainable land management practices for reducing land degradation. Therefore, two villages for the study were selected purposefully. 150 HHs from Deneja Tsiyon kebele 67(42%) of HHs and from Enangia Shime kebeles 83(58%) of were sampling. A detailed questionnaire was administered to household heads. In addition to questionnaire, key informant interviews and focus group discussions were also used to collect the needed information. The sample population for the interviews was included the land users and local authorities' representatives.

### **3.2.3. Sample size determination and sampling technique**

Sample size determinations there are a total of 394 smallholder household heads in *Deneja Tsiyon and Enangia Shime kebele*. The sample population consists of randomly chosen smallholder and the sample size was calculated based on Yamane (1967) at 95% confidence level.

However, because of unexpected restrictions due to COVID-19 pandemic time and budget constraints to conduct research work freely and timely. I take only 150 households for survey data after determining the number of sample households the total number of HHs in Denja Tsiyon and Enangia Shime is 426 and 506 respectively. Proportionate number of Sample by Kebele HHs from each as shown in table 1 below

Thus, the required sample size was computed as

$$n = \frac{N}{1 + N(e)^2} \quad \text{Eq. 1}$$

Where: N = is the size of target or study population

n = is the sample size

e = the maximum tolerable error value of 5% (e = 0.05)

Using this formula the sample is calculated as

$$n = 25,402 / 1 + 25,402(.05)^2$$

$$n = 150$$

Table 1: Proportionate number of Sample by Kebele

s/no	Sample kebeles	Total HHs	Sample	Percentage
1	Deneja Tision	426	67	42%
2	Enangia Shime	506	83	58%
	Total	932	150	100%

### 3.2.4. Tools and techniques of data collection

This research employed both qualitative and quantitative research approaches. The study also used both primary and secondary data sources, which complement each other. Primary sources of data were collected by using household survey, focus group discussion (FGD), and key informant interview (KII) as well as field observation made at small holder farmers farms.

Structured questionnaire was developed to obtain information on the role of sustainable land management practices for reducing land degradation. Then the questioner was translated into local language (Amharic) to ease the data collection and reduce communication gap between

respondents and enumerators. As the data was collected under COVID-19 situation, development agents (DAs) of agriculture office were used as an enumerator after providing one day training on questioner and survey methodology. The researcher together with the data collectors first conducted a questionnaire pre-test in Enangia Shime *kebele* before one week from the actual survey and then the questioner was improved before duplication of the tool and actual administration of the survey.

Sampling of survey households was carried out from the list of households residing in the sample *kebeles* where the list was obtained from the respective *kebele* agriculture and administration offices. The researcher tried to maintain data quality through close supervision of enumerators as well as to some extent directly participating on data collection and reviewing of the complete questionnaire. The data collection was made in yekatit and June.

In addition KII and FGDs were administered before and after the household survey. FGDs and KIIs conducted in Enangia Shime *kebele* before (February 2020, before occurrence of COVID-19 in Ethiopia) the actual HH survey to understand the actual situation and contextualize the survey questioner with real situation. Moreover additional KII and FGDs were conducted in both *kebeles* in June 2020 during the actual HH survey so as to generate pertinent information which can't be captured through the survey. In total, three times FGDs with the two *kebles* participants and five *kebles* and KIIs wereda administrator and DAs were conducted for the qualitative data collection. Due to COVID-19 each FGD consisted of 6 to 7 participants organized from people of different age, sex and social categories such as youth, adult and elderly, men and women (Figure 3). KII was conducted with wereda expert, *kebele* administration official and DAs.



Photo captured during the field research

Figure 3: FGD participants of Deneja Tision and Enangia Shime kebeles

### **3.2.5. Data analysis**

In this study, both qualitative and quantitative methods of analysis were applied. Qualitative information recorded on notebooks from focus group discussion, conversation from key informant interview and from personal observation will be organized and constructed coherently and analyzed in word description form. Accordingly, information obtained from key informant interview with wereda agricultural office workers, kebele administrators and development agents (DAs) and from focus group discussion with different elderly people woman and youth was organized in the form of verbal/ narrative information. A software package, statistical package for social science (SPSS) version 20 was used as a tool to analyze quantitative information collected through FGDs and KIIs were transcribed and summarized using template prepared for this purpose. A thematic analysis of the qualitative data was used to substantiate and explain quantitative data results obtained from statistical analysis. This involves coding and entering the collected data into the computer to analyze and tabulate the results. The data was coded before entering into the cells of the SPSS. The analysis was done by using descriptive statistical analysis, i.e frequency distribution, percentages, bar graphs and cross-tabulations.

### **3.2.6. Ethical consideration**

Clear purpose of the study was depicted on survey questioner to remained enumerators to inform and ask willingness of the respondent to involve in the data provision. In connection to this, enumerators were trained and well informed to follow ethical consideration during the survey. In this process, the researcher checked administration of the survey as per ethical consideration protocol. Thus, 150 respondents who gave their full consent were interviewed. During the interview respondents were informed that codes instead of name or other features that could lead to the identification of the individual respondents' will be used and the analysis performed accordingly. The respondents were also informed that all records used only for research purpose and kept them strictly confidential at all time, which was made as agreed with respondents.

## **CHAPTER FOUR**

### **4. Results and discussion**

#### **4.1. Demographic and Socio-economic Characteristics of the Respondents**

This refers socio economic characteristics of the population expressed statically such as age, sex, marital status, education level, income level, occupation, family size and the like. The primary purposes for analyzing such characteristics of the study population are to pinpoint factors that affect the result of the study and have significant implication on overall findings. Accordingly, the key socio-economic and demographic characteristics of the respondents are discussed in the following subsections.

##### **4.1.1. Age, sex, marital status and family size of the respondents**

Table 2 provided the major demographic characteristics of the respondents such as age, sex composition, marital status and family size and their socio economic implications in relation to sustainable land management practice. It is well known that age is one of important factors that show demographic structure of the population. The effect of changes in age structure on economic growth has been widely studied in demographic and population economics and shows the level of economic dependency within household particularly and overall dependency level of the country in general. Therefore, to assess the age structure of the respondent's, socio economic data were collected from the study area by using house hold survey questionnaires.

The survey revealed that majority of the respondents are belongs to adult (36-65) age group which consists of 83.3 % of all respondents that followed by (21-35) years age group accounting about 12% and 4.7% belongs above 65 years age group. As the survey result shows and supported by FGDs and key informant interviews 83.3 % of the respondents have land, and so issue of SLM is their concern, even as age increase their experience of land management is good and they have better knowledge about the SLM practices. While respondents (21-35) years age group have less experience lesser implementation of SLM and as farmers got worse knowhow.

Sex is another demographic characteristic of the respondents investigated in the survey. As the survey result reveled that out of the total head of household respondents, 78.7% were male and the remaining 21.3% were female. This shows majority of household head are male in the study

area and practices of land management is mostly done by males. So, they are appropriate respondents for the study. Similarly, marital status is one more demographic characteristic of the respondents investigated in the survey. Marital status of the respondents were assessed through field survey and the result showed that, 92% were married, 3.3% were divorced and 4.7 % were widowed (Table 2). This implies that almost majority of respondent's marital status is married. In Ethiopia being land owner is related to marital status, so most of respondents have land owners whom land management is major concern in the study area in both kebeles. Similarly, the finding of the Eshetie, (2018) stated that there is a statistical association between marital status of the household head and decision to implement SLM practices.

Table 2: Respondents sex, marital status and family size

<b>Respondents characteristics</b>	<b>Features</b>	<b>Number (n)</b>	<b>%</b>
Sex	Male	118	78.7
	Female	32	21.3
	Total	150	100
Marital status	Married	138	92.0
	Divorced	5	3.3
	Widowed	7	4.7
	Total	150	100.0
Family size	1-5 members	55	36.7
	6-10 members	93	62
	Above 10 members	2	1.3
	Total	150	100

*Source: own Survey, 2020*

Regarding family size of the respondents the survey results revealed that, majorities (62%) of the respondents reported as they have 6-10 family size which is followed by households having 1-5 family size accounting 36.7% of respondents, while very few (1.3%) respondents have reported as they have above 10 family sizes. On average the survey HHs has 6.14 family members, which is higher than the national average (4.9 family members per HH) for rural Ethiopian households (CSA, 2012). With regards to this, the one sample test ( $p < .05$ ) on mean study household size of respondents revealed that there is statistically significant mean difference on family size of respondents and national rural family size. The survey result shows that in the study area number of family size is high, implying share of each household member in low. Therefore, this urges respondents to serious consider about SLM practices in a sustainable manner.

The implications of such demographic structure of the population show that as no labor problem but the age and availability matters to perform agricultural activities and sustainable environment and land management practice. Therefore, interventions to improve environment and sustainable land management will not be challenged by labor.

#### **4.1.2. Educational Level**

Education is an important factor influencing an individual's attitudes and opportunities. There are various factors affecting educational attainments in the country in terms of the level of wealth, access of educational services, attitude and perception of community on formal education and the like. The implication of education levels with SLM practices, education of the HH head was found to be positive having a significant influence on the adoption of improved agricultural technologies. Education enhances the capacity of individuals to obtain, process, and utilize information disseminated by different sources. This implies that literate farmers are in a better position to get information and use it in such a way that it contributes in their adoption of SLM Practices. Likewise Lapar and Ehui, (2004) argued that longer education leads to a better understanding of the new technology. Several studies report that education has a positive impact in the adoption of improved soil conservation technology. However, in this regard, the survey result (Table 3) revealed that the tendency of respondent's participation in sustainable land management practices is inversely related to education level of respondents.

Assessing educational status of the respondents has paramount advantages and implication in implementation of modern /sustainable environmental and land management practice is those individuals formally enrolled in modern education have a tendency to adapt his/her self to modern rural technologies. However, the data collected from field surveys showed that majority of respondents (86.7%) were illiterate who cannot read and write Household heads who can read and write account about 12% and (1.3%) heads attended up to primary level (grade 1-6). From this result we can conclude that the majority of respondents were illiterates. Therefore, the respondent level of education affect the SLM practices, when there is higher number illiterate household where the respondent attitude, knowledge, access of information and the adoption of technology towards SLM practices is too low. So, the SLM practice and agricultural activity are affected by household level of education. In addition to this, the survey result (Table 3) revealed that the tendency of respondent's participation in sustainable land management practices is

inversely related to education level of respondents. As a result, the Chi-square test ( $p > .05$ ) indicates that there is no statistical association between education level and their participation on sustainable land management practices. This may be linked with the farmer's main livelihood source that depends on land resource based agricultural activities which requires sustainable land management practices to enhance the productivity of farm land irrespective of respondent's education level. Therefore, promotion of SLM and other agricultural technology should consider such limitations.

Table 3: Respondents education level association with their SLM practices

Education level	Frequency (N)	%	Chi-Square Tests	t-value	Df	p-value
Illiterate	130	86.7	Pearson Chi-Square	.414 <sup>a</sup>	2	.813
Informal education	18	12	Likelihood Ratio	.683	2	.711
Grade1-6	2	1.3	Linear-by-Linear Association	.329	1	.566
Total	150					

Source: own survey 2020

#### 4.1.3. Economic activities

According to the field survey data, households economic or sources of income for the livelihoods activity engaged in agriculture (crop production or animal husbandry) 147(80%), households economic or sources of income for the livelihoods activity engaged in trading 22(14.7%), engaged in casual labor work 1(.7%), engaged in skill work (handcraft, carpenter and masonry) 2(2.3%). This result shows that we can conclude that the major economic activity or sources of income for the livelihoods of the respondents in the study area is agriculture where nearly 98% depend on (Table 4).

Table 4: Survey household's major economic activities

Economic activities the HHs engage in	Response	Frequency	%
Engaged in agriculture	Yes	147	98.0
Engaged in trading	Yes	22	14.7
Engage in casual labor work	Yes	1	.7
Engaged in skill work	Yes	2	1.3

Source: Own survey, 2020.

Like most highlands of the country, the study area community involve in mixed crop and livestock production. In Ethiopian highlands, most farmers produce both crop and livestock as the activities complement each other. For example, farmers majorly use livestock for traction in crop production while crop residue provides feed to the livestock (Damene et al., 2012).

According to the survey result shown in the table 6,146 (97.3%), household head respondents where cultivate teff, 109(72.7%), household head respondents where cultivate barley,149(99.3%)household head respondents where cultivate maize,32(21.3%) household head respondents where cultivate wheat, 53(35.3%) household head respondents where cultivate beans ( pea, horse bean, check peas, grass pea),120(80%) household head respondents where cultivate vegetation,110(73.3 %) household head respondents where cultivate root crops(e.g potato). From this, we can conclude that barley 99.3%, teff 97.3% and vegetables 80% of crops that are common cultivated in the study area. Soil maintaining legume crops such as field pea, horse beans, check peas and grass peas are among less cultivated crops. In converse, crops which facilitate erosion due to poor canopy cover like maize and crop that require high level of pulverization (e.g., teff) are cultivated by almost all survey households. The survey households indicated that 128( 87.7%) household head respondents where cultivate teff that are practicing SLMP, 102(93.5%) household head respondents where cultivate barley that are practicing SLMP,129(86.6%) household head respondents where cultivate maize that are practicing SLMP ,29(90.6%)household head respondents where cultivate wheat that are practicing SLMP,44(83%) household head respondents where cultivate beans that are practicing SLMP,62(51.7%)household head respondents where cultivate vegetables that are practicing SLMP and (36(32.7%) household head respondents where cultivate root crops (e.g potato) that are practicing SLMP in both kebeles.

Therefore, the survey households indicated that about three fourth (75%) practicing SLMP on croplands varying from 93.6% farmers on barley cultivated farmlands to 32.7% farmers on vegetable farms. From FGDs and field visit, it was observed that farmers largely cultivate barley on highlands, which relatively have higher (steeper) slope and hence farmers largely practice soil and water conservation (SWC). The information in Table 5 indicates that the crop types like maize, teff, barely, vegetables and potato crops were the major crop type cultivating on both Kebeles

Table 5: Major cultivated crop types by HHs and SLM practices by crop type

Crop type	HHs producing the crop		HHs practicing SLMP	
	N	%	N	%
Teff	146	97.3	128	87.7
Barley	109	72.7	102	93.6
Maize	149	99.3	129	86.6
Wheat	32	21.3	29	90.6
Beans(pea, horse bean, chick peas, grass pea)	53	35.3	44	83.0
Vegetables	120	80.0	62	51.7
Root crops(e.g potato)	110	73.3	36	32.7
Average				75

*Source: Own survey, 2020.*

Table 6 presents the livestock holding of survey households, which reveal that nearly all HHs have livestock. As ox is the major traction animal nearly 99.3% HHs own ox or bulls with considerable variation in the number owned that ranging up to 5. In total, sample households owned 751 Tropical Livestock Units (TLU) which can be averaged to be 5.0 TLU per HH that yield a total of 1,973 TLU in the two sample kebeles which is calculated using the total number of HHs of the sample kebeles and number of livestock.

Table 6: Livestock holdings of survey households

Type of livestock	Unit	Number the HHs own											Total			
		0	1	2	3	4	5	6	7	8	9	10+	No	TLU		
Ox & bulls	F	1	17	67	41	17	7								377	298
	%	.7	11.3	44.7	27.3	11.3	4.7									
Cow & heifer	F	22	45	52	20	8	2	1							257	203
	%	14.7	30.0	34.7	13.3	5.3	1.3	0.7								
Calves	F	59	67	21	2	1									119	70
	%	39.3	44.7	14.0	1.3	0.7										
Sheep	F	43	1	17	19	22	21	12	8	4	3				472	47.2
	%	28.7	0.7	11.3	12.7	14.7	14.0	8.0	5.3	2.7	2.0					
Goat	F	85	17	18	15	7	5		2	1					173	17.3
	%	56.7	11.3	12.0	10.0	4.7	3.3		1.3	0.7						
Donkey	F	19	102	27	2										162	114
	%	12.7	68.0	18.0	1.3											
Horse	F	148	2												2	1.3
	%	98.7	1.3													
Chicken	F	38	5	4	21	14	22	27	5	6	2	6			565	
	%	25.3	3.3	2.7	14.0	9.3	14.7	18.0	3.3	4.0	1.3	4.0				
Beehives	F	109	3	26	8	3	1								96	
	%	72.7	2.0	17.3	5.3	2.0	0.7									
<b>Total</b>													<b>751</b>			

Source: Own survey, 2020.

Although agriculture is major livelihood means of the study community, they have very limited farmland and grazing lands holdings. Considerable proportion (22.7%) of survey respondents own less than a heater of farmland and 42.6% don't own individual grazing lands (Table 8). Households who reported that they own farmlands the size is less than a hectare. As it can be seen in table 8, the majority (94%) of the respondents have almost less than 2 ha of farmland. In converse, on average HHs own nearly 5 TLU livestock. From FGDs and KIIs, it was learned that livestock largely depend on crop residues and very scarce and poorly managed communal grazing lands. This tells that the livestock has been creating considerable effect on sustainable land management. Compression of average family size (6.14 family members per HH) and farmland and grazing lands holding imply shortage of agricultural land. This has a serious implication on the livelihood of local communities unless they focused on sustainable land management practices as well as having reasonable family size. Likewise, the finding of

(Eshetie, 2018) stated that lack of grazing land (problem of grazing animals openly), inconsistency of land management practices and share cropping (giving the farmland to share).

Table 7: Agricultural land holding of survey households

Land owned (ha)	Farmlands holding		Grazing lands holding	
	Frequency	Percent	Frequency	Percent
Don't have	0	0	64	42.6
Less than 1 ha	34	22.7	79	52.7
Between 1-2 ha	92	61.3	6	4.0
Between 2-3 ha	23	15.3		
Over 3 ha	1	.7		
Missing	-	-	1	.7
Total	150	100.0	150	100.0

*Source: Own survey, 2020.*

#### **4.2. Common sustainable land management practices of the study area**

The study showed that the communities have been implemented different sustainable land management (SLM) practices. Household survey, FGDs, KIIs and field observation show that some of study area community practice SLM activities such as soil and stone bunds, trenches on farmlands and waterways, cut-off drains, and hillside terraces on communal lands. As shown in table 8, commonly implemented physical SWC and biological (agronomic) measures as part of SLM practices are stone bund, soil bund, strip cropping and contour farming. Stone band was one of the least implemented SLM practices in the study area. As the survey data indicated about 26% of respondents has reported as they practices this type of conservation methods. Regarding the soil bund practice as shown below on the table, 38.7% reported as they practice soil bund as physical soil and water conservation (SWC) measure. The data collected from key informant interview and field observation, similar results were obtained. The on the line study result of Tegegn, (2014)stated that, improved land management practices that ensure better resource use and promotes long-term sustainability are basic to future food production and to the economic welfare of rural communities.

Table 8: Common SLM practices in the study area

Types of SLM practices	Frequency	%
Stone bund	39	26.0
Soil bund	58	38.7
Strip cropping	112	74.7
Contour farming	130	86.7

*Source: Survey, 2020.*

As shown above on the table 8, nearly three fourth (74.7%) of respondent reported as they have practicing strip cropping to improve land productivity. The focus group discussions and key informant interviews indicated the rationale for practicing method is to reduce the excess consumption of fertilizers and other productivity related factors. The other agronomic practice widely implemented in the study area is contour farming. In this case, the result of survey data shows that 86.7% of households confirmed as they practice contour farming method. This result was triangulated by qualitative data collected from key informant and document analysis of SLM practice implemented in some kebeles which were prone to seasonal flooding. The survey result was in agreement with study conducted on contour farming by Motuma (2017) regarding the contour farming is a common traditional practice of tilling the land along the contours of the slope in order to reduce the runoff on steeply sloping lands.

#### **4.2.1. Anticipated roles of SLM practices**

In connection with this conceptual and empirical evidences the survey result indicated that the benefits of sustainable land management practices to minimize land degradation by reduced soil erosion, increasing water holding capacity of soil, improve soil fertility and, agricultural productivity, helped to increase household income, and by reducing land degradation, flooding and land slide as reported by 86.7%, 63%, 59%, 55%, 41%, 34%, 24% and 22% survey HHs, respectively.

Table 9: Benefits of SLM practices for reducing environmental disaster risk

Purpose of the SLM practice	N	Mean	Std. Deviation
Reduced soil erosion	130	86.7	
Increase water holding capacity of soil	94	63%	.48531
Increased soil fertility	89	59%	.49408
Increased agricultural productivity	82	55%	.49881
Reduced land degradation	51	34%	.47530
Reduce flooding	36	24%	.42851
Reduce land slide	33	22%	.41563

Source: Own survey, 2020

In this regard, studies indicated that unsustainable land management practice can threaten biodiversity and increase the release of carbon especially through the destruction of the forest as well as impacting adversely on water resource management. On the other hand, they present the opportunities“ for enhancing the livelihoods of the poor or fostering inclusive growth as well as for achieving environmental goals (UNCCD & FAO, 2009). Thus, identification of local SLM practices and challenges is critical matter to promote sustainable agriculture.

As discussed in the above, SLM practices are intended to conserve the natural resource so as to enhance production capacities of land for crops and livestock’s production, improve watershed health and forest cover in addition of minimizing and reverse land degradation.

On the top of Recha et al, (2014) argued that the SLM practices are necessary to meet the food needs of the growing population, rehabilitate degraded lands and to adapt and mitigate changing climate impacts. However, these technologies are applied not only for the purpose of immediate soil erosion reduction but also increase percolation of water into the substrata (MoA, 2014).

The FGDs and KIIs also verified that the study community practices crop diversification in the form of crop rotation strip cropping, intercropping (multiple cropping) and planting different type of crop by allocating the small farmland they have, apply integrated agronomic practice and soil management practices like production and application of compost, row planting, hand

weeding and plough oxen driven tinning which locally called “*shilshalo*”. Webb, (2004) indicated that integrated agronomic practices like multiple cropping, mulching, strip cropping, compost making and use, green manure and fertilizer usage, minimum tillage and conventional tillage, physical SWC structures (e.g., bund and terraces) are the most sustainable land management practices and are a key mechanism for effective change in the sustainable use and management of land resources .

In addition to the above mentioned contributions of SLM practice in the study area. To improve environmental degradations and the risk of occurrences of disasters, the secondary data collected from the documents indicated that, one of the main tasks of the Sustainable Land Management Project is to develop and save common lands from degradation (Figure 4).



Figure 4: Stone check dam constructed to protect gully erosions

FAO, (2011) indicated that practices to be truly sustainable must be environmentally friendly, reduce current land degradation, improve biodiversity and increase resilience to climate variation and change. SLM interventions are vital to prevent, mitigate and rehabilitate land degradation. However, it is important to note that choice of SLM practice should be determined as per the local context and particular situation. Moreover, effectiveness of SLM practices must be considered the local context and particular situation of local stakeholders, thus recommendation of different practice can vary across regions/localities based on topographic condition (FAO, 2011).

### 4.3. Occurrence of land degradation in the study area

Assessment on land degradation is base for different intervention, hence land degradation assessed by data collected through various methods so as to understand the need for SLM practice in the study area. In line with this, the survey result (Table 10) revealed that the farmer's perceived land degradation occurring in their localities. The survey households reported occurrence of flash flood on low laying farm land, complete damage of cultivated crop and covering of fertile farmland by gravels and stones washed from the hillside/mountain, soil erosion, and forest resource degradation, which was reported by 94.7% to 99% of respondents (Table 10).

Table 10: Farmer's perception on land degradation at their localities

Items	N	Mean	Std. Deviation
Occurrence of flash flood on low laying farm land	149	.9933	.08165
Washout of seed	148	.9800	.14047
Complete damage of cultivated crop	146	.9733	.16165
covering of fertile farmland by gravels and stones washed from the hillside/mountain	146	.9733	.16165
Soil erosion	142	.9467	.22545
Occurrence of desertification	150	.8667	.34107

Source: Own survey, 2020

Overall, respondents were requested to portray on the advices they have been received from different partners concerned on the essence of sustainable land management practices to reduce environmental disaster risks in sustainable way to enhance livelihood conditions. Accordingly, as stated in the survey result (Table 10) they confirmed the advices that they have been given to conduct sustainable land management practices crop diversification (75%), and utilizing improved agricultural inputs to enhance productivity (73%).

### 4.4. Factors affecting implementation of sustainable land management practice

As per the result of the interview, Sustainable land management practice has been inadequate in study area. As a result shows, low land productivity due to land degradation in form of soil erosion is one of the leading challenges to improving the performance of the smallholder farming system sector in study area. Land Management practices/ technologies is quite crucial to increase

agricultural productivity, ensure food security and improve the livelihoods of smallholder farmers. Farmers advocate various SLM practices for sustainable implementation. However the adoption of such agricultural land management practices/ technologies is still very low.

On the line Tesfaye (2017) stated that in developing countries including Ethiopian high lands land degradation in form of soil erosion and fertility loss are ruthless problems, which have severe implications for food security and livelihoods of local farmers in particular and the nation in general.

On the top of this there are several important influencing factors that explain the adoption decision behavior of smallholder farm households toward various land management practice. Similarly of Adimassu & Kessler (2012), the major socioeconomic factors that influence households decision to adopt soil and water conservation measures include sex and education level of household head, availability of labor force, cattle holding, and off/ non-farm income. In addition to these the finding of World Bank (2007) argued that biophysical characteristics of plots, topography, and agro-ecological variations also influence the adoption decision of soil and water conservation and other sustainable land management practices.

Table 11: Extension service as factor of SLM practice

<b>Factors affect SLM</b>	<b>Response</b>	<b>Frequency</b>	<b>%</b>
Lack of information/knowledge	Yes	131	87.3
Lack of extension services	Yes	134	89.3
Income (cash) shortage	Yes	149	99.3
Lack of access to credit	<b>Yes</b>	<b>150</b>	<b>100.0</b>
Distance farmland form home	Yes	139	92.7
Characteristics of landforms	Yes	135	90.0

*Source : Owen Survey, 2020*

As the table shows lack of information, lack of extension services, income (cash) shortage, lack of access to credit, distance of farmland from home and characteristics of farmland are the main factors that affect the SLM practices. The survey household indicated that 87.3%, 89.3%, 99.3%, 100%, 92.7% and 90%, respectively households are affected by the factors to implement SLM

practice. As per of the study result of (Eshetie, 2018) the major problems affecting farmers to implement SLM practices where small family size, lack of grazing lands or open access to grazing, the small size of land and farm experience of farmers.

#### 4.4.1. Topographic nature as factor for implementation of SLM practice

The topography of farmland may also determine the use of SLMP. Babalola et al (2013) the existence of farmland with the degradation and vulnerability to degradation has its own role to implement SLMP, which means that farmers who cultivate on sloppy and undulating lands are expected to be more conscious of information on SLMP. Farmers having Step slop land have the probability of practicing sustainable land management practices when the farmland of the farmer is very stepper, they are very inclined to practice land management practices in order to protect the soil from erosion and to improve their production output (Motuma, 2017). This implies that the steepness of landform is good to implement SLM practices. In addition to this the Eshetie, (2018) indicates that almost most of the household respondents have mountainous landforms and they are plowing on sloppy areas. This in turn, indicates that the study area was very prone to erosion. Sustainable use is highly affected (among other factors) by bio-physical and institutional aspects of land such as land quality, land fragmentation and tenure systems (Teshome et al., 2016).

Table 12: Nature of land forms where farmers implement SLM

Questions	Response	Frequency	%
Does the nature of land forms influence your decision to implement SLM?	Yes	141	94.0
Do you implement SLM on flat lands	Yes	49	32.7
Do you implement SLM on undulating lands	Yes	44	29.3
Do you implement SLM on steep lands	Yes	66	44.0

*Source: Own survey, 2020.*

As shown above table 12 majorities of respondents confirm that the nature of land forms in their locality was the main factor that influences the decision to implement particular form of conservation measure. This was justified as 94% of respondent responded as nature of land

forms contributed towards implementation of SLM. Regarding the general characteristics of the topography, 49 (32.7%) household respondents have flat form and they are practicing their agricultural practices 106 (70.7%) household respondents were not practicing agricultural practices undulating land forms. Finally, 66 (44%) household respondents have mountainous landform and practicing SLM measures to mitigate topographic induced soil erosion and landslides. This survey data indicates that most of the household respondents reported as nature of landform was a key factors that influence their decision to implement SLM to improve agricultural productivity. Similarly, the result obtained from focus group discussion and key informant interviewers the households having a mountainous and valley landform are very inclined to practice SLM practices than those households having plain landform.

#### **4.4.2. Livestock holding as factor for SLM practice**

Livestock holding was one of the factors affecting the house hold decision to practice SLM in the study areas. As the data indicated that (see table 13) regarding 54% of the households they reported as the decision to use SLM practice are affected by more livestock holding make may family busy to implement SLM. 82.7% of household's decision to implement SLM practices are affected due to more livestock holding, faces feed shortage and hence allow farmland for grassing of livestock freely and the 20.7% of the households decision to use SLM also affected due to more livestock holding, earn more income and pay for casual labour to implement SLM graze on farmland. The study result agreed with Motuma (2016), stated farmer's livestock holding size could be considered as one indicator for better availability of resources or resource endowment.

Table 13: Livestock holding as factor for SLM practices

Effect on your decision to use SLM	Responses	frequency	%
More livestock holding make may family busy to implement SLM	Yes	81	54.0
I face feed shortage and hence allow livestock freely	Yes	124	82.7
Earn more income and pay for casual labor to implement SLM graze on farmland	Yes	31	20.7

*Source: survey, 2020.*

#### **4.4.4. Extension services and land tenure**

The survey data indicated that households agents extension advice from agriculture office 24.0% farmers association 33.3%, model farmers 24.7%, neighbors 30.7% research center 6.0, and NGOs 5.3 %. Therefore, development agents are should be improving their relation with farmers to increase the attitude of farmers towards SLM practices positively, influences SLM Practice on his/her land. The result of this study indicated that, availability and access to extension service was also among factors that influence farmer’s decision on SLM. This may be explained by the fact that the information that farmer gain from extension agents help them to initiate to use the newly introduced land management practices on their farm to protect their land from erosion and improve its fertility. On the line of this result of Tesfaye (2006), stated that the contact between a farmer and development agent and information gained accelerate the attitude of farmers towards SLM practices positively, influences SLM Practice on his/her land. Significant factors consist of access to information (education and extension), access to both input and output markets, social, human and physical capital endowments, credit availability, the profitability of the management technology, and property rights that affect sustainable land management (Kirui, 2017).

Table 14: Extension contact

Advice giver	Response	Frequency	%
From agriculture office extension agents	Yes	114	76.0
From farmers association	Yes	50	33.3
From Model farmers	Yes	37	24.7
From neighbors	Yes	46	30.7
From research center	Yes	9	6.0
Support from NGOs	Yes	8	5.3

*Source: Own 2020*

As per the result of qualitative data collected from key informants and FGD the majorities of participants argued that the land tenure status and the existing extension services were among factors that influence farmer's decision to implement local SLM. Land holding status there was positive effect on his/her decision to adopt land management practices. Furthermore, limited land holding (Figure 6) is one important factor affecting adoption of SLM Practices because lack of tenure security means that people are unwilling to invest in new land management practices on a land which they do not formally own. As per of the result of Habtamu (2006), finding is in indicates that the land holding size of the household were identified as a significant negative influence on farmers decision to retain the introduced land management practices.

## CHAPTER FIVE

### 5. Conclusion and Recommendation

#### 5.1. Conclusion

The study tried to assess the role of sustainable land management practice for reducing land degradation in Quarit wereda, Amhara region, Ethiopia. Questionnaires were distributed to 150 randomly selected household heads. The age of most of the sample respondents was found between 21-65. Sample respondents were both male and female and the majority of the respondents were illiterate. Family size of the majority of the respondent ranges 6-10.

The finding of this study indicates that the occurrence of flash flood on low laying farm land, complete damage of cultivated crop and covering of fertile farmland by gravels and stones washed from the hillside/mountain, soil erosion, and forest resource degradation are common in the study area in both Kebele. As the result of these serious problems aggravate the severity of land degradation in the study area. Therefore, this problem needs solution through conducting sustainable land management practices, crop diversification and utilizing improved agricultural inputs to enhance productivity.

In order to decrease land degradation in the study area respondents in commonly implemented physical SWC and biological (agronomic) measures as part of SLM practices are stone bund, soil bund, strip cropping and contour farming. In addition to this nearly three fourth (74.7%) of respondents they have practicing strip cropping to improve land productivity. The other agronomic practice widely implemented in the study area is contour farming. In this case, the result of survey data shows that 86.7% of households confirmed as they practice contour farming method.

In addition to these the majorities of respondents confirm that the nature of land forms in their locality was the main factor that influences the decision to implement particular form of conservation measure. This was justified as 94% of respondent responded as nature of land forms contributed towards implementation of SLM. Due to more livestock holding, faces feed shortage for livestock and hence 82.7% of household's allow farmland for grassing of livestock freely. The result of this study indicated that, availability and access to extension service was also among factors that influence farmer's decision on SLM.

## 5.2. Recommendation

Finally, the findings of this study have important policy implications for promoting sustainable land management practices and technologies in the study area. Farmers reported that the improved terraces are effective in reducing soil erosion. A range of socio-economic, institutional, personal and biophysical factors determines adoption of SLM practices in the study area. In general, the study recommended the following key issues to improve the practice of SLM in the study area.

Based on the study findings the following recommendations were made:

- To make the land management practice sustainable local government provide great attention and give guidance intended for land management in order to improve the knowledge in terms of training of all age group specially(21-36)because they are young and have capability to do anything.
- The local government should work to promote sustainable land management practice to improve agricultural production and environmental disaster risks. In addition, there is an urgent need to build local capacity in terms of training development agents in agricultural extensions.
- To make the land management practices sustainable the local government would be responsible by taking the common issues to invest their effort in land management practices. In addition, local best experiences must be developed and expand productive approach which is helps to improve local SLM practice.
- Local government will be facilitate agricultural programs and give guidance intended for land management practices in order to increase the awareness level of farmers on the use of sustainable land management practices.

Further research is needed to assess the role of sustainable land management practices for reducing land degradation shall be conduct in the area to better be aware the benefit of the SLM practices to know land degradation reduction technologies and also to increase soil fertility and productivity

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## APPENDICES

### 1- English Version Questionnaire

#### Appendix1: Household questionnaires

**Dear respondent,**

My name is Betigist Simachew. As a master student at Addis Ababa University, college of development studies, Center for Environment and Sustainable Development I conduct research on the role of sustainable land management practices for environmental disaster risk reduction in the selected study areas. The survey may take about \_\_\_\_ minutes of your time to complete, but your answer will play a crucial role to the study I am conducting. I would like to declare that the information collected through this questioner will be used only for academic research purpose; confidentiality of personal data is assured. I highly appreciate your cooperation and I thank you in advance for taking your time to fill in this survey!

#### **I. Identification**

- 1.1. Questionnaire no: \_\_\_\_\_ 1.3. Zone: \_\_\_\_\_  
1.2. Date of interview (DD/MM/YYYY): \_\_\_\_\_ 1.4. District: \_\_\_\_\_  
1.5. Peasant Association (Kebele) \_\_\_\_\_

#### **II. Household information**

- 2.1. Age of respondent \_\_\_\_\_(Years)  
2.2. Sex of respondent:     1) Male         2) Female  
2.3. Total family size \_\_\_\_\_  
2.4. Marital status of households? 1. Married 2. Unmarried 3.Divorced 4.Widowed  
2.5. Education level of households?     1. Illiterate                     2.Informal education  
3.Grade 1 to 6     4. Grade 6 – 12                     5. Collage and above

### III. Socio-economic factors Off-farm activities

#### 3.1.Sources of income for the household head

No	Sources	1=Yes	0 = No
3.1.1.	Agriculture (cattle rearing & farming)		
3.1.2.	Treading		
3.1.3	Employment (monthly/periodically salaried)		
3.1.4	Casual labor work		
3.1.5.	Skill work (Handcraft, Carpentry, Masonry)		

### IV. Land resource

#### 4.1. Where is the topography of your land?

No	Type	1.Yes	0.No
4.1.1.	Flat		
4.1.2.	Undulating		
4.1.3.	Steep		

4.2. Do you think that the land form has any implication to implement sustainable land management practices?            0=No            1=Yes

4.3. If yes, on Q.No 4.2 which landform do you implement?

No	Type	1.Yes	0.No
4.3.1	Flat		
4.3.2.	Undulating		
4.3.3.	Steep		

4.4. Why do you practice in these landform ?

No	Responses	1. Yes	0.No
4.4.1.	Due to high erosion		
4.4.2.	Due to continued production decline		
4.4.3.	Due to hazards like flash flood and sedimentation		

4.5. Do you think the type of crop one produces has anything to do with the decision to practice sustainable land management? 0 = No 1 = Yes

4.6. If yes, on Q.No 4.5 for which crop type you apply SLM practice?

No	Type	1. Yes	0.No
4.6.1.	Teff		
4.6.2.	Barley		
4.6.3.	Maize		
4.6.4	Wheat		
4.6.5	Beans (pea, horse bean, chick peas, grass pea)		
4.6.6.	Vegetables		
4.6.7	Root crops (e.g. potato)		

4.7. What is the size of your farmland \_\_\_\_\_ ha

- a). Less than 1 ha    b). Between 1-2 ha    c). Between 2-3 ha    d). Between 3-4 ha

4.8. What is the size of your grassland \_\_\_\_\_ ha?

- a). Less than 1 ha    b). Between 1-2 ha    c). Between 2-3 ha    d). Between 3-4 ha

4.9. Do you think that there are some reasons related to the size of land owned with owners' decision of land management practice? 0 = No 1 = Yes

#### V. Distance of farm land from home

5.1. How far is your farm land from your home? (In minuets for single trip) \_\_\_\_\_

a). From 5-30s b). From 30-1h c). From 1:30-2h d).above 2h

5.2. Do you think that the distance of your farmland from your home affect to implement the SLM practices? 0 = No 1 = Yes

#### VI. Livestock

6.1. Do you have your own animals? 0 = No 1 = Yes

6.2.If your answer for Q No.7.1 is yes, what type and number of animal do you have? Fill the table below.

N0	Type	quantity
6.2.1	Ox and bulls	
6.2.2	Cow and heifer	
6.2.3	Calves	
6.2.4	Sheep	
6.2.5	Goat	
6.2.6	Donkey	
6.2.7	Horse	
6.2.8	Chicken	
6.2.9	Beehive	

6.3. Do you think that your livestock holding has effect on your decision to use land management practices? 0 = No 1 = Yes

6.4. If your answer for Q.No7.3 is yes, which affect dose it causes?

No	Causes	1.Yes	0.No
6.4.1	More livestock holding make may family busy to implement SLM		
6.4.2	Due to more livestock holding, I face feed shortage and hence allow livestock freely		
6.4.3	More livestock holding helped me to earn more income and able to pay for casual labor to implement SLM graze on farmland that result in distraction of implemented SLM practices		

### VII.SLM Practices

7.1. Did you practice land management in your farmland? 1.0=No 2. 1=Yes

7.2. If your answer is yes in question No.7.1 what is the reason to select this practice?

No	Reasons	1.Yes	0.No
7.3.1	To reduce erosion		
7.3.2.	To improve soil fertility		
7.3.3.	To improve yield		

7.4. Do you believe that practicing sustainable land management practices have their own benefits?

0 = No 1 = Yes

7.5. If your answer for Q.7.4 is yes what type of benefit do you know and/or expect?

No	Reasons	1.Yes	0.No
7.5.1.	To reduce erosion		
7.5.2.	To improve soil fertility		
7.5..3	To improve yield		

7.6. Do you think that you get the benefit because of practicing SLM practices?

0 = No      1 = Yes

7.7. If your answer is yes, which benefit you get from that?

No	Type	0 = No	1 = Yes
7.7.1	Crop productivity increases		
7.7.2	Soil fertility improved		
7.7.3	Soil erosion on farmland decreases		
7.7.4	Food security improved		

7.8.If your answer for Q 8.9 is No, what is your reason for not practicing land management practices?

No	Reason	1.Yes	0.No
7.8.1	Lack of information/knowledge		
7.8.2	lack of extension services		
7.8.3	Income (cash) shortage		
7.8.4	lack of access to credit		
7.8.5	Distance of farmland from home		
7.8.6	characteristics of landforms		

### **VIII. Environmental disaster risk**

8.1. Did you face environmental disaster risk?    0 = No    1 = Yes

8.2.If your answer for Q9.1 is yes, which environmental disaster risk do you face?

No	Reasons	1.Yes	0.No
8.2.1.	Soil erosion		
8.2.2.	Occurrence of desertification		
8.2.3.	Occurrence of flash flood on low laying farmlands		
8.2.4.	Washout of seed		
8.2.5.	Covering of fertile farmland by gravels and stones washed from the hillsides/mountains		
8.2.6	Complete damage of cultivated crop		

8.3 What are the major mechanisms you use to reduce environmental disaster risk?

No	Mechanisms	1.Yes	0.No
8.3.1	Terracing		
8.3.2.	Strip cropping		
8.3.3.	Soil& water conservation		
8.3.4.	Stone bund		

8.4. Do you believe that environmental disaster risk can reduce through sustainable land management practices have their own benefits? 0 = No 1 = Yes

8.5. Do you think that you get the benefit in order to reduce environmental disaster risk because of practicing SLM practices? 0 = No 1 = Yes

8.6. If your answer is yes, which benefit you get from that?

No	Reasons	1.Yes	0.No
8.6.1	Increased agricultural productivity		
8.6.2	Increased soil fertility		
8.6.3	Reduced land degradation		
8.6.4	Reduce flooding		
8.6.5	Reduce land slide		
8.6.6	Increase water holding capacity of soil		
8.6.7	My household income inversed		
8.6.8	Food security status of my household increased		

## IX. Lack of Extension services

9.1. Have you got advice about SLM activities from extension services? 0=No 1=Yes

No	Reason	1.Yes	0.No
9.1.1.	Agriculture office extension agents		
9.1.2.	Farmers association		
9.1.3.	Model farmers		
9.1.4.	From neighbors		
9.1.5.	From research center		
9.1.6.	NGOs		

9.2. On what issue did the advice focus on?

No	Reason	1.Yes	0.No
9.2.1.	SLM practices		
9.2.2.	Crop diversification		
9.2.3.	Input (fertilizer, improved seed) use		
9.2.4.	Improved animal husbandry		

Appendix 2:

**Key informant discussion questions given for both kebel**

**Dear key informants,**

My name is Betigist Simachew. As a master student at Addis Ababa University, college of development studies, Center for Environment and Sustainable Development I conduct research on the role of sustainable land management practices for environmental disaster risk reduction in the selected study areas. The survey may take about \_\_\_\_ minutes of your time to complete, but your answer will play a crucial role to the study I am conducting. I would like to declare that the information collected through this questioner will be used only for academic research purpose; confidentiality of personal data is assured. I highly appreciate your cooperation and I thank you in advance for taking your time to fill in this survey. Date of discussion \_\_\_\_\_  
Wereda \_\_\_\_\_

1. Which type of sustainable land management practice is dominantly practice in this wereda?
2. What are the best practices practiced currently in this kebeles?
3. How much is affect environmental disaster risk in this wereda as well as in this kebeles?
4. What are the roles of sustainable land management practices for environmental disaster risk reduction in this kebele?
5. What are the major environmental risk and risk reduction practices in the wereda?
6. What are factors that affect implementation of sustainable land management in the study area?
7. What measure do you suggest for current and future practice of land management to be sustained?

Appendix 3:

**Focus group discussion questions**

**Dear discussion participants,**

My name is Betigist Simachew. As a master student at Addis Ababa University, college of development studies, Ccenter for Environment and Sustainable Development I conduct research on the role of sustainable land management practices for environmental disaster risk reduction in the selected study areas. The survey may take about \_\_\_\_ minutes of your time to complete, but your answer will play crucial role to the study I am conducting. I would like to declare that the information collected through this questioner will be used only for academic research purpose; confidentiality of personal data is assured. I highly appreciate your cooperation and I thank you in advance for taking your time to fill in this survey! Date of discussion \_\_\_\_\_  
Kebele \_\_\_\_\_

1. How many types of land management practice do you know?
2. Which sustainable land management practice do you practice?
3. What are the major challenges of practicing sustainable land management practices?
4. What are environmental disaster risks you face in your kebele?
5. Are there any losses you face because of don't practicing SLM practices? Which losses you face?
6. What is the determinant factors affecting the implementation of sustainable land management practices?

APPENDICES 4

AMHARIC VERSION QUESTIONNAIRE

**አዲስ አበባ ዩኒቨርሲቲ የሀገር ልማት ጥናት ኮሌጅ አካባቢ እና ዘላቂ ልማት-ማዕከል**

ስም በትግስት ስማቸው እባላለሁ በአዲስ አበባ ዩኒቨርሲቲ፣የሀገር ልማት ጥናት ፣ አካባቢ እና ዘላቂ ልማት-ገበሬማህበርውስጥዘላቂ የመሬት አስተዳደር ለአካባቢዎ አደጋ ስጋት ቅነሳ ላይያለውንአስተዋዕደማወቅየሚያስችል የዳሰሳጥናት እየስራሁ እገኛለሁ። ጥናቱን ለመጨረስ \_\_\_\_\_ ደቂቃ ተሰጠዎታል፤ ነገር ግን የሚመልሱት መልስ ለምስራው ጥናት ወሳኝ ሚና ሊኖረው ይገባል። በዚህ መጠይቅ የማገኘው መረጃ ለትምህርታዊ ጥናት አላማ ብቻ እንደ ሚወል ላሳወቅ እወዳለሁ።ስላደረጋችሁልኝ መልካም ትብብር በጣም አደንቃለሁ እና ጊዜአችሁን ሰጣችሁ መጠይቁን ስለሞላችሁልኝ አመሰግናለሁ!

**ክፍሉ-1 አንድ: የመለያ መርጃ:**

- 1.1.ጥያቄ ቁጥር: \_\_\_\_\_
- 1.2. የተጠየቀበት (ቀን/ወር/ዓ.ም): \_\_\_\_\_
- 1.3.ዞን: \_\_\_\_\_
- 1.4. ወረዳ: \_\_\_\_\_
- 1.5. ቀበሌ \_\_\_\_\_

**ክፍል- ሁለት: የአርሶ አደሩ/የግለሰቡ/ አጠቃላይ መረጃ:**

- 2.1. እድሜ: \_\_\_\_\_ (ዓ.ም)
- 2.2. ጾታ: \_\_\_\_\_ 1.ወንድ \_\_\_\_\_ 2.ሴት \_\_\_\_\_
- 2.3 የቤተሰብ ጠቅላላ ብዛት \_\_\_\_\_
- 2.3. የአባወራ/አማወራ የጋብቻሁኔታ:
  - 1. ያገባ/ች    2.ያላገባ/ች    3. የተፋታች/ የተፋታ    4.የሞተችበት/የሞተባት
- 2.6. የአባወራ/አማወራ የትምህርት ደርጃ:
  - 1. ያልተማረ/ች    2. ኢ.መደበኛ ትምህርት    3.ከ1-6 ክፍል
  - 4. ከ6-12 ክፍል    5. ኮሌጅ እና ከዛባላይ



4.4. ለምን ?

ተ.ቁ	አይነት	አዎ	አይደለም
4.4.1.	ከፍተኛ የአፈር መሸርሸር		
4.4.2	ቀጣይነት ያለው የምርት መቀነስ		
4.4.3.	አደጋ እንደ ጎርፍ እና ደለል		

4.5. የምታመርቱት ምርት አይነት ዘላቂ የመሬት አስተዳደር ለመተግበር እንድንወስን አድርጎናል ብላችሁ ታስባላችሁ? 0=የለም 1=አዎ

4.6. አዎ ከሆነ መልሳችሁ ለየትኛው ሰብል ነው ዘላቂ የመሬት አስተዳደር የምትተገብሩት?

ተ.ቁ	አይነት	አዎ	አይደለም
4.6.1.	ጤፍ		
4.6.2.	ገብስ		
4.6.3.	ማሸላ		
4.6.4.	ስንዴ		
4.6.5.	ባቁላ		
4.6.6.	የስርሰብሎች(ምሳሌ:- ድንች)		
4.6.7.	አትክልት		

4.7. ምን ያህል የእርሻመሬት የይዘታ መጠን አለዎት? \_\_\_\_\_ በሄ/ር

ሀ). ከ1 ሄ/ር ያነሰ ሐ). ከ 2-3መካክል ሄ/ር

ለ) ከ1-2 መካክል ሄ/ርመ). ከ 3-4ሄ/ር መካክል

4.8. 2.የግጦሽ መሬት \_\_\_\_\_ በሄ/ር

ሀ). ከ1 ሄ/ር ያነሰ ሐ). ከ 2-3መካክል ሄ/ር

ለ) ከ1-2 መካክል ሄ/ር መ). ከ 3-4ሄ/ር መካክል

4.9. ዘላቂ የመሬት አስተዳደር ትግበራን ለመተግበር ውሳኔዎት ላይ ከያዛችሁት የመሬት መጠን ጋር የተያያዘ ምክንያት አለው ብለው ያስባሉ? 0=የለውም 1=አለው

**ክፍል-አምስት: ከቤት እስከ እርሻ ቦታ ያለው ርቀት**

5.1. የእርሻ መሬትዎ ከቤትዎ ምን ያህል ይርቃል ?( ለአንድ ጉዞ በደቂቃ).....

ሀ). ከ 5-30 ደቂቃ ለ ) ከ30 ደቂቃ-1 ሰዓት ሐ). ከ 1:30-2 ሰዓት መ ) ከ 2 ሰዓት በላይ

5.2. የእርሻ መሬትዎ ከቤትዎ መራቁ ዘላቂ የመሬት አስተዳደር ትግበራን ለመተግበር ተፅዕኖ አሳድሮብኛል ብለው ያስባሉ? 0= የለም 1=አዎ

**ክፍል ስድስት: የክብት ሃብት**

6.1. የራስዎ የሆነ እንስሳት አለዎት? 0=የለኝም 1= አለኝ

6.2. ለጥያቄ ቁጥር 7.1 መልስዎት አለኝ ከሆነ ምን ዓይነት እና ምን ያህል እንስሳት አለዎት ?

ከታች ያለውን ሠንጠረዥ ይሙሉ

ተ.ቁ	አይነት	ብዛት
6.2.1	በሬ እና ወይፈን	
6.2.2	ላም እና ጥጃ	
6.2.3	የወለደች ላም	
6.2.4	በግ	
6.2.5	ፍየል	
6.2.6	አህያ	
6.2.7	ፈረስ	
6.2.8	ዶሮ	
6.2.9	የንብ ቀፎ	

7.1. የክብት አያያዝዎት ዘላቂ የመሬት አስተዳደር ትግበራን ለመጠቀም ውሳኔዎት ላይ ተፅዕኖ አለው ብለው ያስባሉ ? 0 = የለም 1 = አዎ

7.2. ለጥያቄ ቁጥር 7.1 መልሳችሁ አዎ ከሆነ የትኛው ጉዳት ነው ምክንያት የሚሆነው?

ተ.ቁ	ተፅዕኖዎች	1.አዎ	0.አይደለም
7.2.1	ዘላቂ የመሬት አሰተዳደር ትግበራን ለመተግበር ብዙ ክብት መያዜ ቤተሰቤ ላይ የስራጫና አብዝቶብኛል		
7.2.2	ዘላቂ የመሬት አሰተዳደር ትግበራን ለመተግበር ለእኔ ብዙ ክብት መያዜ ብዙ ገቢ እንዳገኝ እና ለጊዜያዊ ሰራተኛ ክፍያ ለመክፈል አስችሎኛል		
7.2.3	ብዙክብትበመያዜየምግብእጥረትአጋጥሞኛልእናስለዚህለክብቶችየእርሻመሬቴን ለግጦሽስለፈቀድኩዘላቂየመሬትአሰተዳደርትግበራንለመተግበርመደናገርንፈጥሮ ብኛል		

**ክፍል ሰባት: ዘላቂ የመሬት አሰተዳደር ትግበራ**

7.1. ዘላቂ የመሬት አሰተዳደር ትግበራን ይተገብራሉ? 0=አልተገብርም 1=አተገብራለሁ

7.2. ለጥያቄ ቁጥር 7.1 መልሳችሁ አዎ ከሆነ የትኛውን ዘላቂ የመሬት አሰተዳደር ትግበራን ይተገብራሉ?

ተ.ቁ	ተፅዕኖዎች	1.አዎ	0.አይደለም
7.2.1	የድንጋይ እርከን/እርከን		
7.2.2	የአፈር እርከን		
7.2.3	ስብጥር እርሻ		
7.2.4	አፈር እና ዉሃ ጥበቃ		
7.2.5	በመስመር መዝራት/ማረስ		
7.2.6	ብዝሃ ህይወት ጥበቃ		

7.3. ለጥያቄ ቁጥር 7.1 መልሳችሁ አዎ ከሆነ ይህን የመረጡበት ምክንያት ምንድን ነው ?

ተ.ቁ	ይህን የመረጡበት ምክንያት	1= አዎ	0=አይደለም
7.3.1	የአፈር መሸርሸር ለመቀነስ		
7.3.2	የአፈርለምነትን ለመጨመር		
7.3.3	ምርትን ለመጨመር		

7.4. ዘላቂ የመሬት አስተዳደር ትግበራን መተግበር የራሱ የሆነ ጥቅም አለው። በለው ያስባሉ?

0=የለውም                      1=አለው

7.5.ለ ጥያቄ ቁጥር 7.4 መልሳችሁ አዎ ከሆነ ምን አይነት ጥቅም አለው?

ተ.ቁ	አይነት	0-አላገኘሁም	1-አገኝቻለሁ
7.5.1	የአፈር መሸርሸር ለመቀነስ		
7.5.2	የአፈር ለምነትን ለመጨመር		
7.5.3	ምርትን ለመጨመር		

7.6. ዘላቂ የመሬት አስተዳደር ትግበራን በመተግበር ያገኙት ጥቅም አለ?

0= የለም                      1= አለ

7.7.ለጥያቄ ቁጥር 7.6 መልሳችሁ አዎ ከሆነ የትኛውን ጥቅም አገኙ?

ተ.ቁ	አይነት	0-አላገኘሁም	1-አገኝቻለሁ
7.7.1	ምርታማነትን ጨምሮልኛል		
7.7.2	የአፈር ለምነት ጨምሮልኛል		
7.7.3	በእርሻ መሬት ላይ የአፈር መሸርሸርን ቀንሶልኛል		
7.7.4	የምግብ ዋስትናን ጨምሮልኛል		

7.8..ለጥያቄ ቁጥር 7.6 መልሳችሁ አላገኘሁም ከሆነ ዘላቂ የመሬት አስተዳደር ትግበራን ያልተገበሩበት ምክንያት ምንድን ነው?

ተ.ቁ	ምክንያት	0=አይደለም	1=አዎ
7.8.1	የመረጃ /የእውቀት እጥረት		
7.8.2	ተጨማሪ ድጋፍ ማነስ		
7.8.3	የገቢ ማነስ		
7.8.4	ብድር አለማግኘት		
7.8.5	ከቤት አስከ እርሻ መሬት ያለው ርቀት		
7.8.6	የመሬት አቀማመጥ ገፅታ ባህሪ		

**ከፍል-ስምንት፡ አካባቢዊ አደጋ ስጋት እና ስጋት ቅነሳ**

8.1.አካባቢያዊ አደጋ ስጋት አጋጥሞዎት ያወቃል?            0=የለም            1= አዎ

8.2.ለጥያቄ ቁጥር 8.1 መልሳችሁ አዎ አጋጥሞኝ ያወቃል ከሆነ የትኛው አካባቢዊ አደጋ ስጋት አጋጠመዎት?

ተ.ቁ	ምክንያት	0=አይደለም	1=አዎ
8.2.1	የአፈር መሸርሸር		
8.2.2	በረሀማነት መፈጠር		
8.2.3	ድንገትኛ ጎርፍ		
8.2.4	የዘር እጥበት		
8.2.5	ለም የእርሻ መሬት በኮረት/በድንጋይ መሸፈን		
8.2.6	አጠቃላይ የሰብል ጉዳት		

8.3.የአካባቢያዊ ጉዳት ስጋቶችን ለመቀነስ ምን ዋና ዋና ዘዴዎችን ይጠቀማሉ?

ተ.ቁ	አይነት	0=አላጋጠመኝ	1=አጋጥሞኛል
8.3.1	የድንጋይ እርከን/አርከን		
8.3.2	ስብጥር እርሻ እጠቀማለሁ		
8.3.3	አፈር እና ውሃ ጥበቃ		
8.3.4	የአፈር እርከን		

8.4.የአካባቢያዊ ጉዳት ስጋቶችን ዘላቂ የመሬት አሰተዳደር ትግበራን በመተግበር መቀነስ ይቻላል ብለው ያስባሉ?            0 = አላስብም            1=አዎ አስባለሁ

8.5. የአካባቢያዊ ጉዳት ስጋቶችን ለመቀነስ ዘላቂ የመሬት አሰተዳደር ትግበራን በመተግበር ጥቅም አግንቻለሁ ብለው ያስባሉ?            0=አላገኘሁም            1=አግንቻለሁ

8.6.ለጥያቄ ቁጥር 8.5 መልሳችሁ አግኝቻለሁ ከሆነ የትኛውን ጥቅም አገኙ?

ተ.ቁ	ምክንያት	0=የለም	1=አዎ
8.6.1	ምርታማነት ጨምራል		
8.6.2	የአፈር ለምነት ጨምራል		
8.6.3	የመሬት መሸርሸር ቀንሳል		
8.6.4	ጎርፍ ይቀንሳል		
8.6.5	የመሬት መንሸራተት ቀንሷል		
8.6.6	መሬት ወሃ የመያዝ አቅም ጨምሯል		
8.6.7	የቤተሰብ ገቢ ተቀይሯል/ጨምሯል		
8.6.8	የቤተሰብ የምግብ ዋስትና ድረጃ ጨምሯል		

**ክፍል-ዘጠኝ: የተጨማሪ ድጋፍ አገልግሎት እጥረት**

9.1.ስለ ዘላቂ የመሬት አስተዳደር ትግበራ ተጨማሪ ምክር ድጋፍ አግኝተዋል ያውቃሉ  
 0=የለም                      1=አዎ

9.2.ለጥያቄ ቁጥር 8.1 መልሳችሁ አዎ ከሆነ በማን ነው ያገኙት

ተ.ቁ	ምክንያት	1=አዎ	0=አይደለም
9.2.1	የግብርና ቢሮ ተጨማሪ ድጋፍ ወኪል		
9.2.2	የገበሬዎች ማህበር		
9.2.3	ሞዴል ገበሬዎች		
9.2.4	ከጎረቤቶች		
9.2.5	ከምርምር ማዕከል		
9.2.6	መንግስታዊ ካልሆኑ ድርጅቶች		

9.3.የምክሩ ጉዳይ በምን ላይ ነበር ትኩረት ያደረጋችሁት?

ተ.ቁ	ምክንያት	0=አይደለም	1=አዎ
9.3.1	ዘላቂ የመሬት አስተዳደር ትግበራ		
9.3.2	ምርት ማስፋፋት/የተለያዩ		
9.3.3	ግዳብት(ማዳበሪያ፣ ምርጥ ዘር)መጠቀም		
9.3.4	የተሻሻለ የእንስሳት ግብርና		