WOLKITE UNIVERSITY

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DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

ASSESSMENT OF COMMUNITY PARTICIPATION ON SOIL CONSERVATION IN CASE OF ADOLA KURA KEBELE, HULA WOREDA, SOUTH SIDAMA ZONE, SIDAMA REGION, ETHIOPIA

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Declaration

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Mitiku Fena and Solomon Shimeles do here by declare to Wolkite University Department of Geography and Environmental Studies that this thesis is a product of our original research work, and it has not been submitted to any other university for any academic degree. Any materials and information in a report other than our own are duly acknowledged

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Acronyms

CARE -Co-operative Assistance and Relief Everywhere

CSA- Central Statistical Agency

CVM- Contingent Valuation Method

DA- Development Agent

FAO- Food and Agricultural Organization

FAOUNR-Food and Agriculture Organization of the United Nations Rome

GeES- Geography and Environmental Studies

GIS- Geography and Information System

HWADO-Hula Woreda Agricultural Development Organization

IK- Indigenous Knowledge

NGO- Non-Governmental Organization

SWC- Sustainable Soil and Water Conservation

WAO –Woreda Agricultural Organization

ABSTRACT

The study was conducted in Hula woreda Adolakura kebele on the assessment of community participation on soil conservation. The overall objective of study was the assess the assessment of community participation on soil conservation. ln this study primary and secondary data were used; primary data were obtained or gathered through personal observation, Secondary data were obtained from different written materials, published and unpublished source and different books. The total number of households of Adolakura kebele were 450 from this sample size determined by (10%) of the total study which are 82 household, this is done by simple random sampling techniques to give equal chances to all respondents to be selected and minimize biases by every 82 respondents. The data was collected using questionnaire from sampled household and personal observation. The collected data was analyzed qualitatively by using statements and quantitatively by table, frequencies and percentage, presented and interpreted. Soil erosion has its own impact on the environment as well as the countries socio-economic performance. It resulted in agricultural productivity, loss of nutrients and degradation of physical structure which led to shortage of food. Soil erosion is caused by cultivation on steep slopes clearing vegetation overgrazing. According to the respondent, there is soil conservation in the study area and they practice both biological and physical methods of soil's conservation. While practice conservation measure communities were hindered by lack of conserving equipment, lack of incentive, lack of advanced technology and lack of awareness and aside recommended by the research creation awareness, provision of equipment, provision incentives by governs were strategies forwarded by the research to minimize the problem in the study area. The purpose of this study is to investigate the status of soil erosion and its consequence Adolakura kebele of the socio- economic, soil fertility and environment consequence of soil erosion in the study area.

KEY LEGEND: community participation, soil conservation

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Soil is the basic natural resources that directly or indirectly sustain living things throughout the world. Life is impossible without the essential components of soil. But it is changing from time to time because of both natural and human factors. Natural factories such as earth quick, running water, soil erosion, volcanic eruption, wind and human factories are deforestation, agroforestry, and overgrazing *(Chand hooker,2009)*

Much of the world has been facing ever more severe soil erosion of diverse degrees caused by both natural and human factors as well as its consequent environmental deterioration which directly influences the livelihood of households. Among this, soil erosion being one of the natural resources which is the base for all life existence is mostly depleted globally. Erosion is a natural geological phenomenon resulting from removal and transportation of soil particles by water, wind, ice and gravity *(Lal 2006; Gitas et al. 2009).*

Soil erosion is a severe problem of the developing countries in the world today. Africa is characterized by land high degradation and soil nutrient depletion which results in average crop yield to decline and food insecurity *(Danano;2004)*. Africa's highlands have greater problem and lead to soil degradation *(Mesfin, 2020).* According to *(Taffaj, 2008)* sub- Saharan Africa is more vulnerable than other world regions, because its soil is prone to erosion.

Ethiopia is one of the sub-Sahara African countries where soil erosion has reached a severe stage land degradation mainly due to soil erosion and nutrient depletion has become the most important environmental problem in the country. Coupled with poverty, fast growing population policy failures and social unrest, land degradation poses a serious threat to national and household food security *(shiperaus and holden, 2016).*

The Ethiopian Highlands, once endowed with rich natural resources, are agriculturally used for millennia and now heavily degraded *(Gete, 2010).* The interplay between the physical environment and population distribution in Ethiopia explains, to a great extent, the ever-worsening problem of environmental degradation *(Aklilu, 2013).*

The major cause of land degradation in Ethiopia is erosion *(Alemneh,2014)* intensification of cropping on scoping lands without suitable amendments to replenish lost nutrients has led to widespread degradation of land. Available estimates on the economic impact of soil erosion indicate an animal on site average productivity loss of 2.2 % from the 2011) yield level *(FAO, 2012).*

In the country Ethiopia, whose people's livelihood predominantly depends on agriculture, maintaining and efficiently using soil is a prominent issue for increasing productivity and in turn income of every society which is a pivotal to reduce poverty at household levels. However, lack of appropriate and effective approaches for the wise management of the natural resource is a colossal challenge facing the country in its ambition to realize both environmental protection and community's livelihood security. Poor conservation of environmental services has led to its serious degradation in the last 50–60 years (MEA, 2005). The crisis of soil erosion is serious for Ethiopia, in which the agriculture sector plays the dominant role in the economy and livelihood of the people. The cause, consequences and possible ways of minimizing soil erosion require serious consideration.

Ethiopian community still continues implementing unscientific methods of cultivation which are the main causes for topsoil erosion by wind and rain. Soil erosion is an ominous threat to the food security and development prospects of Ethiopia (MEA, 2005).

Land degradation is an economic problem when it reduces productivity in an individual community. Because of this the community either has to take conservation measures or has to bear loss of productivity as a result of erosion *(Demeke, 2012)*. Similarly, in Adolakura kebele the problem seriously affects the community living in this kebele (HWADO,2024). This study were held in Adolakura kebele of Hula woreda Sidama regional state (South Hula) at present; this area is facing extreme soil degradation.The principal factors responsible for the problem include very steep topography, inherent erodible nature of the soil and expansion of farmland by clearing forest. In the area, soil erosion is a foremost and serious problem. Factors such as:intensive erosion, the topography, deforestation and overgrazing are the focal reasons for soil erosion at Adolakura Kebele. Soil erosion in the study area followed by numerous convoluted problems, resembling loss of upper fertile soil, reduction of agricultural productivity and scarcity of food are resulting in migration of the people which is a pivotal difficulty for poverty reduction.

The history of the community is inseparable from that of soil and water management and the community have long recognized that they must manage the soil well if they are to expect good harvests.

As a result, the intent of these studies would be to confirm the importance of local community participation of soil conserving, utilization in the level of community participation and come up with other conservation methods to reduce poverty at household levels at Hula Woreda.

1.2 Statement of the Problem

The problems of soil loss now have become a worldwide difficulty and the loose of soil either by natural processes or by mismanagement is harmful for agricultural development and moreover for the whole ecosystem *(Sharma,2005:247).* Soil deteriorated in different way is the loss of the potential productive capacity of the soil, due to such destructive processes soil erosion, water losing and excessive accumulation of harmful salts *(Somani, 2009).*

Many countries can anticipate continued exposing of crop production for either domestic consumption or export due to rapidly expanding population environmental threat to the sustain ability and productivity of crop is devotion focus of many countries *(FAOUNR, 2017).*

According to *Joss Rose 2015*, Soil is one of the most important and essential natural resources. Farmers and gardeners know this fact and go to great efforts to conserve it. They understand that when the soil is destroyed, then gardens will not be successful and good crops cannot grow. They also know that it takes a considerable amount of time for soil to form. In order to obtain a good harvest, soil fertility is very essential.

Ethiopia as country, seriously affected with lack of soil fertility in the highland of Ethiopia, deforestation has reduced tree cover to 2.7% of the surface area 50-60%of the rainfall is estimated to be lost as run off carrying 2-3 billion tons of the top soil away annually *(Hurni,2011).* Some of the reasons are lack of awareness among society about proper utilization of soil, overgrazing. Absence of well-structured soil conservation practices. The degradation of a large part of the Ethiopian highlands has reached where it will become increasingly difficult even to maintain the present-day production of basic food which is already insufficient in many regions of the country *(Athafie2010, cited in Demeke2008).*

In Hula woreda especially the study area Adola kura kebele are similarly the community seriously affected by soil erosion, so in this area soil erosions is a major and critical problem

owing to different factors, both natural and human factors.Because community participation in soil conservation practices is low compared to the other kebeles (HWADO,2024). Where few studies conducted to related topics, on valuation techniques to understand the community participation to conserve soil, farmer's willingness to pay for soil conservation activities using CVM methods e.g. Asrat et al. (2004), Tessema and Holden, (2006), Belay, (2015) and Bamlaku and Yirdaw, (2016). Most studies did not specify soil conserving and its influences, causes of soil erosion which are explained specifically by Jember and Mekonen (2000). Due to these issues our study was attempt to fill the gap to assessing the community participation on soil conservation and factors affecting the participation of local community, to come up with some alternative mechanisms.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study was to assess the community participation in soil conservation in Adolakura Kebele Hula Woreda,South Sidama Zone,Sidama Regional State.

1.3.2 Specific Objectives

To identify the main cause of soil erosion in the case of study area..

To identify willingness of the local community participation in soil conservation in the case of study area.

To identify the Factors that Hindered Community from Participation in Soil Conservation in study area.

1.4 Research Questions

What are the major causes of erosion in the study area?

Do local community have willingness to participate in soil conservation in the study area?

What are the Factors that Hindered Community from Participation on Soil Conservation?

1.5 Significant of the Study

The study was aimed to provide information about factors that wandered community participation on soil conservation. It also helped to widen the awareness among the community in implementation of any conservation policies and help to identify the factors affecting community participation on soil conservation and find other alternative solutions. Then to find out the methods employed to maintain the soil fertility. It leads to an increase the production of local communities in the study area. It may also serve as a preliminary source for other researchers who are interested in working with this title. Based on this study community develop awareness of soil erosion. Additional government bodies used to plan to prevent soil erosion in similar kebeles to increased productivity of the community.

1.6 The Scope of the Study

The study was conducted in hula woreda, especially Adolakura kebele. This study focuses on the assessment of community participation on soil conservation practice in Adolakura Kebele. We emphasized on community participation on soil conservation and to identify the methods employed by the local community to maintain soil fertility and to overcome soil erosion problems.

1.7 Limitation of Study

In the case of conducting this research, we were faced different difficult, such as: - unwillingness of respondents to give required information at needed time, time constraint or shortage of time with other works like assignment and exams but, the researcher had managed the shortage of time by increasing working hour, the financial problem will also the basic constraints for our study.

1.8 Operational Definition

Soil is the loose surface material that covers most land. It consists of inorganic particles and organic matter. Soil provides the structural support to plants used in agriculture and is also their source of water and nutrients. It varies greatly in their chemical and physical properties.

Soil erosion **is** a gradual process that occurs when the impact of water or wind detaches and removes soil particles, causing the soil to deteriorate.

Soil conservation is about solving the problems of land degradation, particularly accelerated soil erosion.

Community participation on soil conservation**;** the foremost objective was to assess community participation on soil education as a means of achieving sustainable development for a given area.

1. 9 Organization of Paper

This research paper contains five chapters, chapter one describes introductory parts, background of the study, statement of the problem, objective of the study, research question, significance of the study, limitation of the study, scope of the study, and organization of the study. The second chapter is the review of related literature. The third chapter deals with the methodology and description of the study area while the fourth chapter analyzes and interprets of the study. Finally, the fifth chapter highlights conclusion and recommendation.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. Defining Basic Concept of Soil

Soil is a primary means of agricultural production supporting the livelihood of all rural people directly or indirectly. Soil is a natural resource, which is generated every year through the natural process. Soil erosion is interchangeably used with land degradation however; soil erosion is only one form of land degradation. Soil is the loose surface covering of land in which all plant life grows. It is a complex mixture of weathered minerals and rock particles, partially decomposed organic matter and hosts of living organisms. Thus, soil is an assemblage of mineral particle organic matter, living organisms, water and air components that form the surface covering of land. It can be considered an ecosystem by itself. The term land degradation can be defined in various ways in relation to soil erosion to describe its negative impacts on land productivity *(Hundson, 2011).*

2.2. Soil Erosion

Soil erosion is the significant ecological restriction to sustainable agricultural production mainly under substance agricultural production system like in central high land. Soil erosion is triggered and become principal obstacle for sustained and integrated socio-economic development of the nation. As the result the present status and rates of soil erosion in Ethiopia call for immediate action to reserve soil erosion hence, to protect soil resource from different immediate action should be taken with the help of soil conservation mechanism to sustain the productivity of the land *(Here, 2001).*

Soil erosion is the removal of top soil from earth surface by agents of erosion, these agents were natural such as running water, wind, and ice and by human factors such as deforestation, overgrazing, burring of cover crops which erodes the fertility of the soil *{Haregeweyn etal.2013).* Soil erosion accounts for the major forms of land degradation in developing countries, and at the sometime. It is difficult to be late and measure its impacts on productivity even when the means and resources are available *(Ayalnesh, 2012).*

2.2.1 Types of Soil Erosion

Sheet Erosion; detachment of soil particles by raindrop impact and their removal downslope by water flowing over land as a sheet instead of in definite channels or rills.

Gully Erosion is the removal of soil along drainage lines by surface water runoff. Unless steps are taken to stabilize the disturbance, gullies will continue to move by head ward erosion or by slumping of the sidewalls. It's far easier and more economical to do repair work in the early stages of newly formed gullies.

Rill Erosion is the type of erosion that occurs as water flows over a hill slope and cuts shallow, curvy channels into the topsoil. If the rills are not mended, with more water flow they can form gullies. Gully erosion is the erosion that causes deeper cuts into the soil and is more detrimental to the environment.

2.2.2 The Causes of Soil Erosion

The causes of soil erosion are many complexes that are cultural, social, economic and environmental factors that play varying roles and parts. It is quite recently that there are more interests in the political situation and economic causes of soil erosion *(Blokier and brook field 2010).*

Regarding soil erosion different scholars, geographers, voiced many physical and social (human made) factors as cause of soil erosion and mater and winds are the major agents of soil erosion. Different scholars and geographers raised different point's concurrent with the causes of soil erosion. According to *G.Chasta(2012)*, rain is an important force of erosion in countries like Ethiopia, where rainfall is heavy, the slope area and the land has been cleared for farming.

Mekuriya feleke (2009) states that soil erosion caused by the activity of man and his domestic animals, according to *mesfin w/selassie (2011)* soil erosion is the combined effect of topography, climate and anthropogenic practice.

Regarding the study area mentioned above both natural and manmade factors are also the cause of soil erosion, however, information that we obtained from (*WAO, 2017)* suggest that deforestation cover cultivation and improper forming practice are the major cause of soil erosion.

Human Activities;The activities of human beings directly or indirectly are the chief factor that cause accelerated soil erosion. Humans via their activities are considered as the major cause or agents of soil degradation, because all the other factors play a role to the extent of retarding or accelerating soil erosion depending on human interference.

By Natural; Natural Erosion is the weathering of the Earth's surface by water ice or other natural environment conditions of climate without human interference as the definition indicates the former type of erosion the most hazardous which is caused by the day-to-day activities of human beings for their own existence in the physical environment.

2.3 Soil Conservation

Soil conservation is the wise use of different types of land use such as farm land, forest land, recreational land and grazing (*ency,2010).* Conservation of farm land involves maintaining high levels of nutrient and organic matter to the soil through plowing under certain conditions (world book, q995, vol-1) They also add organic chemical fertilized to replace nutrient that leaching and growing plant remove. In addition to this farmers flow and plants their field in the way that controls soil erosion (world book, vol-2). The main reason for soil conservation is to maintain its permanent useful resources for the coming generation. The rate of soil degradation should be limited to the amount that will not affect its feature productivity. We all depend on the conservation of our soil because we really on the products of soil for survival, soil transport hidden by showing the degrading water, reducing steepness of the slope, constructing barriers or stress, cultivation of contour or cropping with contour strips. The effectiveness of the slope method depends on cost weather the equipment can be used or the management desire to make along plans for use of land *(R.p, Tripath,2011).* The central components of sustainable agricultural age are crop rotation addition or organic material (crop residue, compost, animal and green manure) farm diversification and integrated and wood management *(Tafa Tulu,s 2010).*

According to *George, Smith (2010)* soil conservation is defined as the practice of arresting or minimizing artificially soil deterioration. Its importance has grown because excessive cultivation of soil for agricultural production results in degradation. In addition the pressure averted by growing world population on the soil resource exacerbates the need for soil conservation since the mid-19th century *(encyclopedia science and technology,2013).*

According to *Ackman and Patton (2012)* in this work in encyclopedia of environmental biology management soil means making input to change three importance concepts there-to increasing the level of production, to maintain stable production with low risk of loss and to maintain the soil resource. Soil conversation includes all forms of human action to prevent and treat soil Grow, *(2014 cited in Demeke 2015*).

2.3.1 Ways/methods of Soil Conservation

Biological Methods of Maintaining Soil Materials -- These methods comprise suitable measures that enable to prevent and maintain nutrients found in soil, at same time provide improved structure to the soil and protect soil erosion. The biological involve practices that enable to protect the depilation of soil nutrient such as organic humus, mineral and water from soil, provide this nutrient and improve the structure. Such as:-

Cover Crops: Planting cover crops, such as legumes or grasses, helps protect the soil from erosion, improves soil structure, and enhances organic matter content, Blanco-Canqui, H., & Shaver, T. M. (2021).

Conservation Tillage: Adopting conservation tillage practices, such as no-till or reduced tillage, minimizes soil disturbance, maintains crop residue on the soil surface, and promotes soil moisture retention, Kassam, A., Friedrich, T., Shaxson, F., & Pretty, J. (2019).

Agroforestry: Integrating trees and shrubs with agricultural crops in agroforestry systems can enhance soil organic matter, improve soil structure, and reduce erosion through the binding action of tree roots, Nair, P. K. R., & Kumar, B. M. (2018.

Mulching: Applying organic or inorganic mulch on the soil surface helps reduce evaporation, conserve soil moisture, control temperature fluctuations, and minimize erosion by protecting the soil from direct impact of rainfall (Kumar, etal...2020).

Crop Rotation and Diversification: Implementing crop rotation and diversification practices helps break pest and disease cycles, improves nutrient cycling, and reduces soil erosion risks associated with continuous mono culture (Teasdale, etal…2018).

Use of Mechanical Structure; These are manmade earthy works useful in reducing or controlling soil erosion, particularly around agricultural land. These include; -

Terracing: Constructing terraces involves creating level or nearly level platforms on sloping terrain. Terraces help reduce water runoff, minimize soil erosion, and retain moisture within each terrace level (Zhang etal…,2019).

Contour Farming: Implementing contour farming involves plowing and planting crops along the contour lines of the slope. This practice helps slow down water flow, reduces erosion, and enhances water infiltration into the soil (Fox etal….,2021).

Bunding: Constructing bund involves building small barriers or ridges along the contour or across the slope to slow down water flow, reduce erosion, and retain sediment. Bunding is particularly effective in areas with high rainfall intensity (Siziba etal…., 2019).

Diversion Channels: Constructing diversion channels involves creating channels or ditches to redirect surface water runoff away from vulnerable areas prone to erosion. Diversion channels help prevent water accumulation and reduce the risk of soil erosion, Prasad, R., & Mondal, M. (2020).

Conservation Tillage Equipment: Utilizing conservation tillage equipment, such as no-till planters or strip tillage machines, helps reduce soil disturbance during planting. This practice preserves soil structure, reduces erosion, and enhances organic matter retention (Lal, 2020).

2.4 The Willingness of The Local Community Participation in Soil Conservation.

2.4.1 Role of Community Participation in Soil Conservation

Soil conservation the presentation of erosion of cultivated land and other are depends essentially on the reduction of soil detachment and run off and on the maintenance of adequate vegetation grown cover thus good soil management is the crucial for conserving soil and maintain productive of land, soil conservation involves the various methods used of to reduce of soil erosion to prevent depletion of soil nutrient, soil moisture and to in rich the nutrient status of the soil. The conservation techniques include both the new and traditional bounds and the newly introduced stone bound, tracing, check dam and plantation *(Tiffen, etal,2015).*

2.4.2 The Advantages of Community Participation on Soil Conservation

The innovation of local community in planning and caring out conservation program is request for its success. People who caused erosion and its people who working together who must find the cores and apply them *(FAO,2013).*

According to *encyclopedia (2013)* of climatology, there are some measures of soil conservation. This includes expansion of vegetation cover, controlling over grazing, food control, proper land utilization, prohibition of shifting cultivation, to maintain soil fertility, establishment for resource institute and training for soil scientific and effective agencies for soil management.

The community participation in the plan preparation of soil conservation has many advantage as it decrease the risk of unacceptable failure of introduced soil conservation measure, to make farmers aware of soil erosion problem and enable them to contribute solution to overcome the problem, to identity properties and targets for reaching the objectives of conservation measure, to enable them design enough soil conservation measures, make farmer to drivers of conservation techniques rather than dormant follower of the formulated policy and create a positive interaction between farmers and development agencies *(Getechew,2015).*

2.5 Factors Hindered Community from Participation on Soil Conservation

Conservation practice projects implemented in the country failed to consider local peoples, economic, demographic, institutional and technological factor from their inception. However, the soil conservation practices are considerably influenced by different factors. Among other influences, characteristics of farmers such as age, education, household size, farm size and experience are some major influences. Age of the farmer is an important characteristic that affects participation on soil conservation. Age of farmers tends to influence the conservation decision negatively in that it decreases participation in environmental protection *(Belay,2012).*

CHAPTER THREE

3. DESCRIPTION OF STUDY AREA AND RESEARCH METHODOLOGIES

3.1 Location of Study Areas

Hula woreda is found in the southern part of the Sidama region of Ethiopia, part of Aleta wondo zone. The woreda is 92 km away from Hawassa and 275 km away from Addis Ababa . Hula is bordered in the south by the oromia region, in the west by Dara, in the northeast by Aleta Wondo, in the north by Bursa and east by Bona. The major town in hula is Hagerselam, woreda on Bursa and Bona zuria were separated from hula.Hula had 110 km of all-weather roads and 8km dry weather per 1000km2 latitude and longitude of 6°29'N and 38° 31'E and elevation between 2759 and 2820 m above sea level *(HWADO,2005)*

3.1.1 Map of Study Area

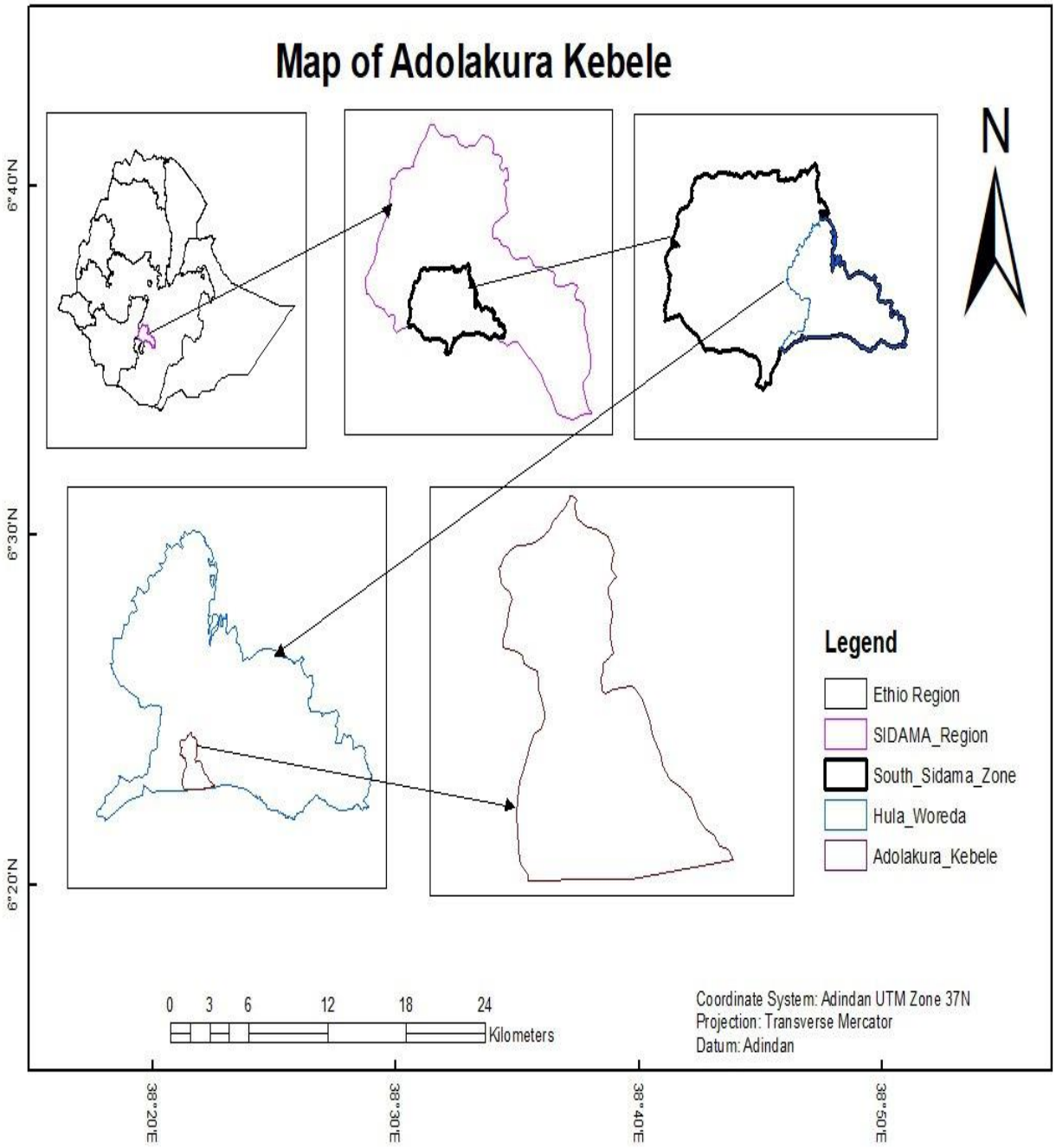

Figure 1 Map of Study Area

Source:(Ethio GIS)

3.2 Physical Character

3.2.1 Topography

The topography feature of the woreda consists of plain,mountain and valley.The altitude of woreda from 1400 to 2800 meters above sea level. The altitude of eastern part range between 2258 to 2800 above sea level and western lower part between 1400 to 1700 meters above sea levels *(HWADO 2024)*

3.2.2. Climate

It has a dega weather condition extreme minimum temperature less than 5° to 6-10° connective day. Moreover, Hagerselam experienced minimum temperature below zero degree (0°) lowering up to 0-3 degree from three (3) consecutive days. Thus, condition could have negative influence on the normal growth and development of plant the maximum temperature also 20-30° *(Wikipedia, org Hula woreda accessed on April 12/08 /15 E.C)*

3.2.3 Vegetation

The study area has different agro-climatic and topographic environments, the distribution of vegetation also goes in line with this agro climatic and topographic landscape. The existing natural forest the major are include kereru (militia ferruginea), Bahirzaf (Eucalyptus camaldulensis), niche Bahirzaf(Eucalyptus globules), shola (focussure), wanza (coda Africana), warka (Focusvista), zigba(podocarpus flatus), shisho (ceticsorcane), kosso(Hageman Abyssinia), tid (yefanji), *(HWADO, 2024).*

3.2.4. Soil Type Study Area

Soil is loss or un consolidated upper most part of the earth's surfaces. According Hula woreda agricultural office the study area is characterized by more than one kind of soil. The types grouped in different category based on color. The type of soil is available in the study areas are black soil is 60%. Red soil is 15% and brown soil is cover 25% (*HWADO 2024).*

3.3 Demographic Character/Socio Economic Activities

3.3.1 Land Use Type

Land use is a series of operations associated with input on land, carried out by humans with intention to obtain product and or benefits through using land resources. The land use structure of the study area has been changed over time. It is clearly seen mainly in highland and lowland areas. In high land areas farmers are replacing tier crop land with eucalyptus plantation whereas low lands substitute their land with chat and coffee. Land use change and land fragmentation in the study area worsening factor for natural resource degradation. A survey of land in this woreda shows that 59.6% is arable or cultivable, 36.2% pasture, 23% forest and the remaining 1.8% is considered as a swampy important cash crop including corn, wheat barley local to cabbage and potatoes (HWADO 2024)

3.3.2 Population

According to the CSA 2007,the total population of this woreda is 129,263, of which 64,551 are males and 64,712 are females. 6,410 people, or 4.96% of the population, are urban residents (reported HWADO 2024)

3.3.3 Religious Activity

In CSA 2007,the majority of the population is Protestant, with 77.26% of the population reporting that faith, 8.09% practicing traditional religion, 6.1% practicing Ethiopian Orthodox Christianity, 3.67% Catholic, and 2.12% Muslim He was a believer (HWADO 2024)

3.3.4 Economic Activity

In (2015) a survey of the land in this woreda shows that 59.6% is arable or cultivable, 36.2% pasture, 2.3% forest, and the remaining 1.8% is considered swampy, degraded or otherwise unusable. Important cash crops include corn, wheat, barley, local varieties of cabbage, and potatoes. According to a 2004 report, Hula had 110 kilometers of all-weather roads and 8 kilometers of dry-weather roads, for an average road density of 274 kilometers per 1000 square kilometers (HWADO 2024)

3.4 Research Methodology

3.4.1 Research Design

The research design for this study would employ a descriptive type of research design. The objectives of this study were described to make clear about community participation on soil conservation and its impacts on poverty reduction at household levels. This research employed both qualitative and quantitative methods. To analysis the raw data which collect from respondents the descriptive analyze for qualitative and numerical data for quantitative had been used.

3.4.2 Research Approach

In the study researchers were employed with mixture of both quantitative and qualitative research approach. This is because mixed approaches were very important and comprehensive, clearly explaining and describes the issues of current practice of sustainable assessment of community participation on soil conservation.

3.4.3 Target Population of Study

Target population of study is farmers of Adolakura kebele, total population of the Adola kebele 1340 in which 800 of them are male and the rest 540 females. From this total population of the kebele 450 households (300 male &150 female) of them are householders. Therefore, using different techniques and the size of the study would be obtained from householders (HWADO 2024)

3.4.4 Sample Size and Sampling Technique

Among the different type of sampling techniques researchers used simple random sampling techniques. Due to simple random techniques as this method have no personal bias and every person have the right to be selected and it gives reliable and accurate information. Hula woreda has 17 kebele from those kebele researchers would be selected Adolakura kebele purposively, because of the community participation on soil conservation practice, this kebele is low compared to the other kebele (reported *HWADO,2024)*.

3.4.5 Sampling Size

According to the *2007* population census of Ethiopia, Hula woreda Adolakura kebele has 450 households. Because of time and financial limitation, it is difficult to get information from 450 household due to the study is conducted on 82 respondents by using simple random sampling methods. In order to determine the sample size we will apply Yemane (1967) mathematical formula as follow

n=N/1+N(e)2

Where n=sample size

N= number of households

(e) = level of precision(error)

n=N/1+N(e)2

n=450/1+450 (0.1)2

=450/1+450(0.01)

=450/1+4.5

=450/5.5=81.81~82

3.5 Data Source and Method of Data Collection

3.5.1 Data Sources

In order to get more reliable data and accurate data for achievement of both general and specific objective researchers used both primary and secondary data. The primary data sources are collected from sample farmers, models and HWADO. For qualitative data, key informants' interviews will be conducted to support the information obtained from the primary. Again, in order to gate in-depth information about the community participation in the soil conservation and its impacts on poverty reduction we would employe farmers on sampled kebele. The secondary data sources are collected from Journals, books and other published and unpublished documents and reports from the Woreda agricultural and rural resource management office and others.

3.5.2 Method of Data Collection

A. Interview

It includes both individual interviews (e.g. one to one). the data were recorded in a wide variety of ways including audio recording, written notes and others. It assumes that there is a questionnaire and one or more interviewer. The interview was conducted with 5 purposively selected farmers who have more experience and knowledge consequently the interviews would select from (1) soil conservation management officials (2) land management officials, (3) kebele administration officials (4) environmental protection official (5) woreda agricultural official. the purpose of, the interview is prov the ideas of the interview about the phenomena of interest.

B. Observation

Observation is the best way to collect data. This can be done directly or indirectly with the subject knowing origin unaware that the researcher is observing them. Interpretation of data would be done using the following mechanisms; descriptive observation, carefully writing down what would be observed, inferential observation: writing down an observation that would be inferred by the subject's body language and behavior, evolution observation making an inference and therefore a judgment from the behavior would be made.

C. Questionnaires

Questionnaire/survey/is instruments used for collecting data in survey research. They usually include a set of standardized questions that explore a specific topic and collect information about the problems of soil conservation techniques and demographic activities. These questionnaires more than one-word answers, the answers could come in the form of a list, a few sentences or something longer such as speech, paragraph or essay. Eg what is your favorite memory from childhood? Whereas, a close-ended questionnaire can be answered in only one word or very short phrase. It is also used in the situation of "yes" or "no".are you happy? yes or no.so the researcher would use both open and closed questionnaires to perform the role of indigenous knowledge in soil conservation activity in the study area.

D. Focus group discussion (FGD)

The data collected from this method to enable discuss flow their information freely and clearly they give the most agreed information about the issues after getting the initial issues for discussion. The participants in the focus group discussions are residents of study area consisting

of two elders, two female house hold heads and other one key informants. Discussion has been to make within three groups of different individuals in community. They discuss the issues relate the community participation on soil conservation .

3.5.3. Ethical consideration

The Researchers have certain ethical standard considerations suggested by (*kvale, 2009*). These include informing the participants about the purpose of research, voluntary participation, confidentiality, avoiding dependent relations and . The researchers would conduct after getting full willingness and consent from the participants, participation in interview voluntarily

3.6. Method of Data Analysis and Interpretation

The descriptive methods of data analyses are used after the necessary collection of primary and secondary data. The collected data shall be analyzed simultaneously to check the internal consistency of the data. The data analyses and interpretation process were through both qualitative and quantitative methods. Information collected from open ended questionnaires and interviews was analyzed qualitatively and information collected from close ended questionnaires was analyzed quantitatively by using percentage and table.

CHAPTER FOUR

4. DATA ANALYSIS AND INTERPRETATION

This chapter describes the result and interpretation of the study. The data obtained from the respondent was analyzed in the form of table and percentage. This chapter also contains background of the information; socio economic and demographic characteristics such as sex, age, religions, education status, and family size of the respondent and a major cause and its impact of soil erosion, Level of soil erosion, and conservation strategies were briefly discussed. It focuses on key findings of the study that is generated through questionnaire 82 selected respondents and interviews from other individuals or concerned bodies.

4.1 Background of the Respondent

It is important to describe the characteristics of sample household respondents before attempting to treat the primary objects of the study. The researcher tried to explore information about the respondent's age, sex marital status, education status, and family size to have general understanding on the respondent's background information.

4.1.1 Age Distribution of the Households

Table 4.1 Age Distribution of the Households

No	Age	No of respondents	Percentage
1	15 – 24	10	12.19%
2	25 – 34	14	17.08%
3	35 – 44	30	36.6%
4	45 – 54	9	10.11%
5	55 – 64	12	14.63%
6	Above 65	7	8.53%
Total		82	100%

Source:field survey(2024)

As table 4.1 show 12.19% of the respondents were the age between 15-24, 17.08%were the age between 25-34, 36.6% of the total respondent's range between 35-44, 10.11% of the total

respondent's range between 45-54, 11.63% of the respondents ranges between 55-64 and 8.53% of the respondents were range between of 65 and above.

Though, from the above table researchers recognize the age structures of 35-44 were good participants on communities to conserve soil and actively engage to minimize poverty at household levels

4.1.2 Sex Distribution of the Respondents

Table 4. 2 Sex Distribution of the Respondents

Sex	Number of respondents	Percentage
Male	50	60.98%
Female	32	39.02%
Total	82	100%

Source, field survey (2024)

As Table 4.2 shows that 50 (60.98%) participants were a male and the remaining 32(39.02%) respondents were female. Male's household's head are much greater than that of the female's household head in the study area.

4.1.3 Martial Statuses of the Respondents

Table 4. 3 Martial Statuses of the Respondents

Marital status	No of respondents	Percentage
Married	40	48.80%
Unmarried	20	24.40%
Divorced	10	12.2%
Windowed household	12	14.60%
Total	82	100%

Source, field survey (2024)

Table 4.3 shows that out of the total 82 sampled respondents 48.80% of were married households have married but to some problem live health economic and shortage of land some all unmarried, divorced and widowed the percentage of sampled farmer distribution of unmarried, divorced and widowed 24.40%, 12.2% and 14.60% respectively.

4.1.4 Educational Levels of the Respondent.

Most of the farmers who are living in the area are not educated. Their educational status presented below.

Table 4.4 Educational Level of Respondents.

Educational status	No of respondent	%
Primary education	6	7.31%
Secondary education	17	20.73%
Certificate	16	19.51%
Diploma	28	34.15%
First Degree	5	6.2%
PH. Degree	0	0%
No schooling	10	8.2%
Total	82	100%

Source, field survey (2024)

On table 4.4 5(5.6%) respondents are primary education, 6(7.31%) of the respondents are secondary education, 17(20.73%) of the respondents are certificate, 16(19.51%) of the respondents are diploma, 28(34.15%) are first degree and 5(6.2%) of the respondents are no schooling. From these respondents the researcher interpreted that 34.15% of respondents are diploma. So, highly participated by other respondents. This data shows that the educational status of majority respondents was diploma and their participation was also higher than the others.

4.1.5 Family Size of Respondents

As information from field surveys through distributing questionnaires to farmers imply size most of the HHs are below 6 and 8. The family size is presented below.

Table 4. 5 Family Size of Sample Respondents

Number of HHS family size	Number of respondents	Percentage
<2	6	7.31%
2-4	11	13.41%
4-6	23	28.05%
6-8	30	36.60%
>8	12	14.63%
Total	82	100%

Source, field survey (2024)

As it can be seen in table 4.5 most of the sampled respondents have 6-8 of the members. This clearly reveals the high concentration of population in the area. It also causes, when there is a high population growth, a high demand of agricultural land use and it leads to soil erosion. And the majority of the households are involved in the conservation of the soil.

4.2 Means of Livelihood.

Merely it is true in many developing countries of the world and also Ethiopia agricultural is the main means of people's livelihood. Hence, it is unquestionable in the study area of Hula woreda AdolaKura kebele almost all the people are dependent on agriculture, particularly mixed farming. However, this farming system is not that much suitable for soil conservation practice in the study area. According to table 4.6 most households (48.78%) depend up on arable farming while 36.58% and 14.64% of the sampled respondent depend on mixed farming and animal husbandry respectively.

Table 4. 6 Means of Livelihood of Respondents

Number	Activity	Respondents	Percentage
1	Arable farming	40	48.78%
2	Mixed farming	30	36.58%
3	Animal husbandry	12	14.64%
Total		82	100%

Source, field survey (2024)

4.2.1 Size of Farm land per Household

Information from the field survey indicates more than 3/4th of the sampled farmers in the study area husbandry between 1-2 hectares of land per household.

Table 4. 7 The Farm Land Size of Sampled Respondents

Farm land size per hector	No of respondents	Percentage
1-2 hector	41	50%
2-3 hector	29	35.36%
3-4 hector	12	14.63%
Total	82	100%

Source, field survey (2024)

As table 4.2.1 shows more than half of the respondents 41(50%) have 1-2 hectares of land per household and 29(35.36%) and 12(14.63%) of sampled respondents have 2-3- and 3-4-hectares land respectively. It indicates that there is high scarcity and fragmentation of land as well as a large number of populations who depend on agricultural activity to meet his or her livelihood requirement so these requirements are the implication on soil resources such as deforestation, overgrazing and over cultivation etc. are influenced of conservation measures.

4.3 The Causes of Soil Erosion

Based on the data obtained from sampled respondents, soil erosion in the woreda area is mainly caused by both physical and human factors, according to them physical cause of soil erosion includes:- excessive

rainfall, down slope topography and absence of vegetation and crop cover. The major human factors which caused soil erosion, according to them include: - mal-agricultural practice, deforestation, overgrazing etc.

Table 4. 8 Cause of Soil Erosion

Cause of soil erosion			
	Item	Respondents	
		Frequency	Percentage
Physical factors	Excessive of rainfall	26	31.70%
	Down slope of topography	6	7.30%
	Wind	7	8.50%
Human factors	Mal-agricultural practice	11	13.40%
	Deforestation	20	24.40%
	Overgrazing	12	14.60%
	Total	82	100%

Source, field survey (2024)

According to table 4.2.2 half of the respondents (52.5%) replied that soil erosion is caused by human factors while (47.5%0 of the respondents said that soil erosion is caused by physical factors.

4.4 Soil Conservation and Major Technique of Reducing Soil Loss

Table 4. 9 Soil Conservation

Item	Response's	Respondents	
		Frequency	Percentage (%)
Is there any soil conservation measure in your kebele	Yes	32	39.02%
	No	50	60.98%
	Total	82	100%

Source, field survey (2024)

As the above table indicates about 32(39.02%) of the some respondents reported that there is soil conservation measure in the area.That is based indigenous techniques to conserve soil erosion hazards, such as strip cultivation, contour farming, crop rotation, afforestation and reforestation and 50(60.98%) of the respondents reported there is no soil conservation measures due to lack of requirements(equipment) while conserving soil.

4.4.1 Extent of Community Participation on the Soil Conservation

Table 4. 10 The Extent of Community Participation on Soil Conservation

The degree of respondents	Respondents	
	Frequency	Percentage
Every day	11	13.41%
Once a week	25	30.50%
Once a month	37	45.12%
Once a year	9	10.97%
Total	82	100%

Source, field survey (2024)

According to the above table about 11(13.41%) of the respondents responded that they have been participating on conserving soil practice every day, 25(30.50%) of them were participated on soil conservation practice a one week, 37(45.12%) of the respondents were participated once a month and the remaining (10.97%) of the respondents were participated on soil conservation practice once a year. From the above table, the majority of the communities participated on soil conservation practice once a month in the study area.

4.4.2 Major Methods/Techniques of Reducing Soil Loss

Table 4. 11 Types of Techniques Used

Types of techniques	Methods	Respondents	
		Frequency	Percentage (%)
Biological techniques	Crop rotation	38	46.34%
	Mulching	25	30.50%
	Strip cropping	12	14.63%
	Others	7	8.53%
	Total	82	100%
Physical technique's	Terracing	18	21.95%
	Farm pond	15	18.3%
	Contour farming	39	47.56%
	Control overgrazing	10	12.19%
	Total	82	100%

Source, field survey (2024)

Because of the topography of According to the above table, about 38(46.34%) of the respondents used crop rotation methods, 25(30.50%) of the respondents used mulching, 12(14.63%) of them used strip cropping and the remaining 7(8.53%) of them use other to reduce soil erosion which were categorized under biological techniques. Regarding physical techniques, about 18(21.91%) of the respondents practiced tracing methods, 15(18.3%) of them used farm pond, 39(47.56%) of the respondents practiced contour farming and the remaining 10(12.19%) of them practiced controlled overgrazing methods of soil conservation techniques. This implies that farming is crop rotation is the most widely used method of soil conservation from both the techniques in the area.

4.4.3 Problem Encountered while Conserving Soil

Table 4.12 Response on Problem while Conserving Soil

Items	Responses	Responses	
		Frequency	percentage
Have you faced any problem encountered while conserving soil?	Yes	71	86.60%
	No	11	13.40%
	Total	82	100%

Source, field survey (2024)

As the above table indicates, about 71(86.60%) of the respondents responded that they were encountered with problems while conserving soil in the area while the remaining 11(13.4%) of them responded that they were not encountered with problems while conserving soil. From this the researcher concludes that there is a problem which encountered the community while conserving soil in the study area.

4.4.4 Problem Hindered Community from Participating on Soil Conservation

Table 4. 13 Problem Encountered

Problem encountered	Respondents	
	frequency	Percentage
Lack of incentives	28	34.14%
Lack of materials like wood, stones etic	40	48.78%
Lack of advanced technology	14	17.08%
Others	-	-
Total	82	100%

Source, field survey (2024)

According to the about table above 28 (34.14%) of the respondent responded that they were hindered by the problem of lack of incentives, 40 (48.78%) of them were hindered by lack of materials like wood, stones, and the remaining 14(17.08%) of the respondents were hindered by lack of advanced technology. From this, the researcher concludes that lack of advanced technology is the major problem hindered by the community followed by lack of materials like wood, stones in the area.

4.4.5 Factors Affecting Soil Conservation Practices

Table 4. 14 Factor Affecting Farmers Participation on Soil Conservation

Number	Factors	Respondents	percentage
1	Lack of finance	14	17.08%
2	Scarcity of farm land	18	21.95%
3	Lack of full material	28	34.14%
4	Insufficient trained extension work	7	8.53%
5	Unsustainable of farm land	6	7.32%
6	Land tenure system	9	10.98%
Total		82	100%

Source, field survey (2024)

According to above table, about 14(17.08%) of the respondents responded that of lack of finance, 18(21.95%) of them respondents responded that of scarcity of farm lands 28(34,14%) of them respondents responded that of lack of full materials, 7(8.53%) of the respondents responded that of in sufficient trained extension work, 6(7.32%) of the respondents responded that of unsustainable farm land and 9(10.98%) of the respondents responded that of land tenure system. As it can be seen in table 4.14 most of the farmer's (34.14%) mentioned lack of full materials as main problems to soil conservation practice.

4.5 Interview Information Collect from Agricultural and Rural Development Office.

Role taken by the government on soil conservation

As the interview reported that, the role taken by the governments on soil conservation were: -

Creating awareness to local community
Provision of incentives to the society
Provision of equipment required while conserving soil

4.6 Important Gained from Conserving Soil: -

As the interview responded, conserving soil has many benefits to the ecosystem, as all life existence related to soil conserving soil is conserving life in general i.e, it conserves; water quality, increasing fertility of soil, sustaining life, preserving habitat, promoting soil organisms, and boosts agricultural activities.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusions

Today throughout the world, the depletion of natural resource is among the major problem facing human beings. Soil being one of natural resources which is base for all the life existence is mostly depleted globally. Soil erosion is a severe problem in the highlands of Ethiopia especially in Northern and Central highland of Ethiopia. The loss of topsoil results in to the decrease of agricultural productivity, higher fertilized requirement s, land degradation. As soil affects the whole ecosystem conservation measures in needed, soil conservation is the conservation of soil productivity or involves reducing soil erosion, preventing, and restoring of soil fertility.

The soil of Ethiopia is general and that Hula woreda (study area) are highly degraded. In the study area, soil erosion is mainly caused by both natural and human factors including deforestation, overgrazing, over cultivation, topography, excessive rainfall, wind etc. As reported by the respondents there is conservation in the study area, they use both biological and physical techniques of soil conservation to reduce the erosion of the soil in their kebele. From the physical methods, they practiced farm ponds, terracing, contour farming and control over grazing. They practiced biological techniques such as crop rotation, mulching and strip cropping. While practicing conservation, communities were hindered by several factors like lack of incentives, lack of materials like woods and stones and lack of advanced technology.

According to the respondents, in study area local community were affected by lack of conserving equipment, lack of knowledge about the importance of soil, nature of soil and drought in conserving soil. Generally, the government created awareness to the local community, provision of incentives to the societies, provision of required equipment while conserving in order to minimize the problem.

5.2 Recommendation

On the base of the major findings of the study, the following are the main recommendation forwarded by the researcher. The farmers should be trained and advices to up raise their pre-existing tradition of maintaining of soil fertility. The farmer of study area should be advised to modernize their indigenous methods of soil conservation. The woreda agricultural office (WAO) should have responsibility to develop through education and training. The WAO and non-governmental development program are recommended to cooperate in afforestation and reforestation program which have a multi- function such as reducing soil erosion, moderate local climate, and serving source of construction as materials. The government and non-government agents are recommended to formulate and implement tier conservation policies, basing the local peasant. That means they are highly recommended to give due to conservation peoples participation for effective implementation of their resource consumption policies of every level.

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APPENDIX

Questionnaires

Dear Respondents

This study is mainly conduct for assessment of community participation on soil conservation, so your genuine response is greatly required as a part of the study and come up to identify the methods of soil conservation in our woreda and to come up with some recommendation on about the constraints which affect the active participation of community in soil conservation, the researcher would make his heart request your participation in the study by giving your kindly response.

Part: 1 General Information

Age A, 15-24 ☐ B, 25-34 ☐ C, 35-44 ☐

D, 45 ☐ E, 55-64 ☐

Sex A, Male ☐ B, Female ☐

Marital Status A, Married ☐ B, Unmarried ☐

C, Divorced ☐ D, Windowed ☐

4. Educational Status A, Illiterate ☐ B, Read and Write ☐

C, Primary school ☐ D, secondary school ☐

5. Family size A, 1-2 ☐ B, 2-4 ☐ C, 4-6 ☐

D, 6-8 ☐ E, > 8

Part 2, Questionnaires for respondents

6. Which types of farming system do you use to meet your livelihood?

A, Arable farming ☐ B, Mixed farming ☐

C, Animal husbandry ☐ D, Other specify …….

7. How much hectares of land do you have?

A, Greater than one hectares ☐ B, Two hectares ☐

C, Three-hectare ☐ D, Greater than four hectares ☐

8. What are major cases of soil erosion in your farmland localities?

Human factor A, over grazing ☐ B, Man agricultural practice ☐

C, Deforestation ☐ D, Other specify ……

Physical factor A, Excessive of rain fall ☐ B, Down slope topography ☐

C, Absence of vegetative and crop cover ☐ D, wind ☐

9. Do you participate on soil conservation in your kebele?

A, Yes ☐ B. No ☐

10. If your response is ‘’ A” when do you participate?

A, Every day ☐ B, once a weak ☐

C, Once a month ☐ D, Once a year ☐

11. Is there any soil conservation methods practiced by your community?

A, Yes ☐ B, No ☐

12. If your answer is ‘’ A’’ what are the methods used to control soil erosion your locality?

A, Crop rotation ☐ B, Mulching ☐ C, strip cropping ☐

D, Cheek dam ☐ E, Tracing ☐ F, contour cultivation ☐

G, Fallow cultivation ☐ H, Afforestation and deforestation ☐

13. Have you faced any problem encountered your conserving soil?

A, Yes ☐ B, No ☐

14. If yes what problem encountered you?

A, lack of incentives ☐

B, Lack of materials like wood, stone etc. ☐

C, lack of advanced technology ☐

D, other (specify)_____

15. What factors affecting farming participation on soil conservation practice?

A, lack of finance ☐ B, scarcity of farmin ☐ C, lack o ☐ material

D, insufficient trained extension work ☐ E, unsuitable of farm land ☐

F, land tenure sustain ☐

PART 3 Interview Question

1. In your local community what are factor affecting soil conservation practice?

_____

_____

_____

_____.

2. What is the role taken by government on soil conservation?

_____

_____

_____.

3. What method do you apply to conserve soil?

_____

_____

_____.

4, what importance do you gain from conserving soil?

_____

_____

_____.