ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLEGE OF DEVELOPMENT STUDIES

SOCIO-ECONOMIC IMPACTS OF COMMUNITY BASED AREA CLOSURE: THE CASE OF BOSET WOREDA, OROMIA REGIONAL STATE, ETHIOPIA

BY

TEWODROS BERHANU

ADDIS ABABA, ETHIOPIA

JUNE, 2022

SOCIO-ECONOMIC IMPACTS OF COMMUNITY BASED AREA CLOSURE: THE CASE OF BOSET WOREDA, OROMIA REGIONAL STATE, ETHIOPIA

BY

TEWODROS BERHANU

A THESIS SUBMITTED TO COLLEGE OF DEVELOPMENT STUDIES DEPARTMENT OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ART IN DEVELOPMENT STUDIES

ADVISOR

PROFESSOR FEYERA SENBETA

ADDIS ABABA, ETHIOPIA

JUNE, 2022

DECLARATION

I hereby declare that this thesis entitled "Socio-Economic Impacts of Community Based Area Closure: The Case of Boset Woreda, Oromia Regional State, Ethiopia" is my original work, has not been presented for degrees in any other University and all sources of materials used for the thesis have been duly acknowledged.

Tewodros Berhanu

Signature_____

June, 2022

Addis Abeba, Ethiopia

ENDORSEMENT

This thesis submitted to Addis Ababa University, School of Graduate Study for open defense examination with my approval as an advisor.

Professor Feyera Senbeta _____

Advisor Signature

Addis Ababa University, Addis Ababa

JUNE, 2022

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by Tewodros Berhanu entitled " Socio-Economic Impacts of Community Based Area Closure: The Case of Boset Woreda, Oromia Regional State, Ethiopia" and submitted in partial fulfillment of the requirements for the Degree of Master of Art in Development Studies, Environment and Sustainable Development Program, complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Internal Examiner: _____Signature_____Date_____

External Examiner: _____Signature_____Date_____

Academic Advisor: _____Signature_____ Date_____

Contents

ACKNOWLEDGMENT

Thanks to God Our Father and The Lord Jesus Christ who made possible the accomplishment of this paper without problem. I would like to express, my post profound gratitude and sincere appreciation to my advisor Professor Feyera Senbeto, whose consistent and genuine advice and guidance, and immense knowledge contributes to the completion of this paper.

My special honor and gratitude goes to Assefa Tofu (PhD), World Vision Ethiopia Food and Water Security and Rural Commercialization Field Operations Manager for his support, guidance, trust ,motivation, enthusiasm, immense knowledge and moreover, the opportunity to work and more to learn in his Land Scape Restoration Projects.

It is my great pleasure to thank to Boset Woreda administration, Agriculture and Rural Development Office and World Vision Ethiopia Boset Area Program for their help in providing me with the necessary information and facilitation. I am especially grateful to Alemayehu Regassa, Tassew Gemeda, Lilisa Feyissa, Almaz Ayana, Berehanu Fekade and others who participated in the data collection. My special gratitude goes to farmers of the study area who responded to the survey questionnaires.

I would like to experience my genuine, heartfelt gratitude for my mother Tihitina Bogale and my father Berhanu Mekonnen; you were always there to make things easier for me.

I would like to express my deepest gratitude to my lovely twin sisters Eleni Berhanu and Lidiya Berhanu for the encouragement in my study in particular and throughout my life in general.

My heartfelt thanks go to my best friends Shibiru, Eyob, and others for their help and hospitality in the course of my research.

LIST OF ABBREVIATION

CSA ……Central Statistics Authority

FAO …….Food and Agriculture Organization

FGD…….. Focused Group Discussions

HH ……Household

NGOs ……..……Non-Governmental Organizations

SSA…….……Sub Saharan Africa

SPSS.....Statistical Package for Social Science

WB…….……World Bank

WDR ……..World Development Report

USD ……United States Dollar

Glossary

Kebele	The Smallest Administrative boundary in Ethiopian Government
Woreda	An administrative unit which supervises or governs several *Kebele* Administrations

ABSTRACT

Land degradation is a major environmental problem for both developed and developing nations. Area closure has recently emerged as one of the strategies to rehabilitate and restore degraded environments in many parts of the world. Despite wider expansion of the practice limited studies exist on its socioeconomic advantages. Therefore, this study examines the socio-economic impacts of community based area closure in the Boset Woreda of Oromia Regional State, Ethiopia. Data was generated from 301 household surveys using simple random sampling techniques. Both qualitative and quantitative methods of data analysis were employed. The study findings revealed that about 60.1% of the respondents disagreed towards the establishments of area closure due to lack of awareness about the benefit. After establishment almost all respondents supported the idea of expanding the experience further in their respective localities. The majority of respondents (96 percent) also confirmed that the initiative provided socioeconomic and environmental benefits, as it contributed to soil conservation, improved animal feed, increased honey production and biological diversity in the area, increased productivity of adjacent farmlands, increased the esthetic value of the land, and created conducive environmental conditions for the local communities benefiting. Respondents identified reduction of farm plots, a lack of strong stakeholder collaboration to protect and manage the area closure, and restrictions on livestock movement as major issues associated with the establishment of the area closure in the study area. The study concludes that community-based area closure has improved the socioeconomic status of the community in the study area and has become a viable option for addressing rural poverty.

Keywords: Socio-economic, Area closure, Community based**,** , Rehabilitation

CHAPTER ONE

INTRODUCTION

1.1. Backgrounds of the Study

One of the world's most pressing environmental challenges is land degradation, which is defined as the process of diminishing the productive capability of land resources (Le et al., 2016; Nkonya et al., 2016). For instance, in 2008, the United Nations Food and Agriculture Organization (FAO) reported that more than 20% of all cultivated areas, 30% of forests, and 10% of grasslands undergoing degradation in the world. A recent study by Le et al. (2016) reported that about 29% of the global land area covered by the degraded land, which are affecting about 3.2 billion people who are especially rural communities, smallholder farmers, and the very poor in the developing regions of the world. Land degradation is mainly triggered by population pressure, expansion of agricultural land, deforestation, and over-exploitation of the natural resources (Mganga et al., 2015; Yirdaw et al., 2017, Manaye et al., 2019). It is one of the major drivers of declining agricultural productivity, increasing food insecurity, rural poverty, and deterioration of ecological functions in the world (Gashaw et al., 2018). Thus, land degradation must be combated through rehabilitation and ecological restoration in order to sustain the long-term productivity of land resources and the continuity of life on the planet (Asmare & Gure, 2019; Manaye et al., 2019). Improved land productivity, food security, livelihoods, biodiversity, ecological balance, and other ecosystem services and functions are all enhanced by successful land rehabilitation and ecological restoration efforts (Mureithi et al., 2014; Reside et al., 2017; Mekuria et al., 2017). For example, closuring degraded area from human and livestock interference is one of the successful rehabilitation efforts ongoing in many parts of the world in order to combat land degradation (Manaye et al., 2019).

Land degradation is one of the most serious issues in Sub-Saharan Africa, jeopardizing the lives of millions of people (Blay et al., 2004; Le et al., 2016; Nkonya et al., 2016). Likewise, it has been severely affecting agricultural production, livelihoods, and provision of other ecosystem goods and services in Ethiopia. Extreme weather conditions, notably drought, high population pressure, overgrazing, agricultural area expansions, and inappropriate land-use practices, such as over-cultivation and mono-cropping, are all key causes of land degradation in Ethiopia (Taddese,

2001; Gashaw et al., 2018; Megerssa & Bekere, 2019). Low or declining agricultural production, increased food insecurity, loss of biodiversity, drying up of springs and water bodies, climate change, and desertification are all severe impacts of land degradation in Ethiopia(Taddese, 2001; Abebe et al., 2014; Gashaw et al., 2018).

To combat land degradation problems, Ethiopia has initiated extensive land rehabilitation programs, including establishment of area closure, and soil and water conservation activities. Particularly, the establishment of area closure considered an important tool to rehabilitate the degraded land, improve agricultural productivity, restore natural vegetation, reduce soil erosion, and improve hydrological cycles, and microclimate in the country (Betru et al., 2005; Mekuria et al., 2013; Teketay et al., 2018). As a result, the practice of establishing area closures has emerged as a promising practice in different parts of Ethiopia, namely in Tigray (Mitiku and Kindeya, 2001), and Wello and Shewa (Soars et al., 2005).

Similarly, Boset Woreda of East Shoa Zone of Oromia has long been victim of land degradation. As a result, the local community are regretting for their past action and actively contributed their part to reverse the the ongoing land degradation problems. Therefore this attempted to examine the socio-economic impacts of community based area closure: In the case of Boset Woreda, Oromia region state, Ethiopia.

1.2. Statement of the Problem

Area closure is a type of land management, implemented on degraded land for environmental restoration (Tucker and Murphy, 1997). It is the process of closing the land plots to protect against interference from people and domestic animals, allowing a process of rehabilitation of the degraded lands (Nedessa et al., 2005; Mekuria et al., 2017). Establishment of area closures as re-greening strategy for restoring degraded hillsides was started in the Northern part of Ethiopia and later became a nationwide exercise (Damene et al., 2013; Damene et al., 2020). This introduction and expansion of closures' have shown an impressive result in restoring the degraded lands through improving species composition and diversity which normally lead to an improved ecosystem. Several studies have also confirmed that area closures lead to the improvement of the density, diversity, and population structure of woody species (Mengistu et al., 2005; Mastewal et al., 2006; Mekuria et al., 2007; Mekuria et al.,2009; Damene et al., 2013; Getachew and Malke, 2015; Damene et al., 2020; Mekuria et al., 2020; Adem et al.,2020).

Moreover, it increases livestock feed and reduces runoffs (Mekuria et al., 2009). It can also potentially improve local communities' livelihoods beyond rehabilitating degraded lands if carbon stored in the closure is traded (Powellet al., 2013; Mekuria et al., 2017). In spite of these biophysical contributions, many communities claimed that area closures' could not bring adequate socioeconomic benefits (Mekuria, 2013; Mekuria et al., 2017; Gebregziabher et al., 2017). Since the primary motive of establishing area closures was to restore degraded lands, other benefits such as improved access to livestock fodder, increased water access, agricultural productivity, and job creation are ignored. The establishment of area closures is mainly driven by conservation agenda, irrespective of the livelihood agenda. This has led local communities to raise a question on the worthiness of area closures creating little incentive to adopt the practice beyond short-term expectations of economic benefits (Mekuria et al., 2017).

Communities can manage resources successfully and avoid mismanagement of communal resources if they are certain of the benefits of their investments in particular environmental resources (Charles et al., 2020). So far several studies have been conducted on the ecological aspect of Closures since 1997. Irrespective of the study sites, age of the closure, and the methodologies employed, these studies agreed on the positive contributions of closures in restoration of degraded ecosystems and has been one of the re-greening strategies in East Africa (Yayneshet et al., 2009; Mekuria et al., 2017). However, limited studies are available on the perception of the community concerning the socioeconomic gains of area closures in Ethiopia in general and in Bose Woreda in particular. Increasing effect of soil erosion, deforestation and overgrazing has caused Bose Woreda to be a victim of land degradation. In response to the land degradation, different rehabilitation measures have been launched by government and nongovernment organizations. Thus, the socioeconomic contribution to local people and community perceptions towards area closure in the study area has not sufficiently studied and documented. Therefore this research tried to fill this gap by providing additional knowledge about the socioeconomic impact of area closure among the community in Boset Woreda.

1.3. Research Questions

The study aimed to answer the following core research questions

i. What is the perception of the communities towards the establishment of area closure?
ii. What are the contributions of area closures to community in terms of socioeconomic benefit?
iii. What are the major challenges of while practicing area closures?

1.4. Objectives of the Study

General Objective:

The general objective of the study is to analyze the socio-economic impacts of community based area closure in the case of Boset Woreda.

Specific Objectives

i. To study the perception of the community towards community based area closures in the study area,
ii. To assess the socioeconomic benefits of community based area closures in the study area
iii. To examine the challenges of community based area closures in the study area

1.5. Significance of the Study

The outcome of this study would hopefully enrich information about the socio-economic impacts of community based area closure in Boset Woreda in Oromia regional state, Ethiopia. This finding can be helpful for better understanding of the perception of the local community towards area closures in the study area, the benefit of area closure to the community as well as the challenge of practicing area closure. It can also help policymakers in designing appropriate policies and strategies for intervention. More importantly, Woreda experts and *Kebele* development agents can use this finding for local people awareness creation. The outcome of this study also believes to be useful for stakeholders that are engaged in the development of area closure. Finally, the findings and conclusion for this study can be used for the academician as a reference for further research areas targeting the area closure as well as it can helps to widen the knowledge base in relation to socio-economic impacts of community based area closure.

1.6. Organization of the thesis

This thesis is organized into five chapters. Chapter one contains introduction, background of the study, statement of the problem, research questions objectives of the study, significance of the study, scope of the study and organization of the study. Chapter two deal with review of both theoretical and empirical literatures. Chapter three describes the research methodologies of the study. The fourth chapter deals with the findings and discussion of the study. Finally, conclusions and recommendations of the study are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Concept and Definitions

Area closure In this study 'area closure' is defined as area delineated to exclude human and livestock interferences. The importance of area closure to improve vegetation cover, composition, density, richness, diversity, and providing economic and ecological benefits to local communities around is widely documented (Emiru, 2002; Tefera, et al.,2005; Emiruet al., 2006; Ambachew, 2006).

Area closure refers to the practice of land management whereby livestock and humans are excluded from accessing a severely degraded area of land. The purpose of exclusion of animals and humans is to prevent further degradation of the ecosystems, advance re-vegetation and restore the overall ecological conditions of the area. This enhances the growth of grass and woody vegetation and helps to rehabilitate specified area and improves the microclimate, which is a strong climate adaptation mechanism. Moreover, area closure is an intervention measure that boosts land productivity and plays a key role in carbon sequestration, therefore mitigating climate change as well (Abenet et al., 2016).

2.2 Theoretical Concept of Rehabilitation and Restoration

Ecological succession is the study of how biological communities reassemble following natural or anthropogenic disturbance – has been a foundation in ecology, and the theoretical framework underpins many aspects of the discipline (Egerton, 2015). Although succession is sometimes perceived as an old fashioned topic, recent studies and reviews demonstrate that succession continues to play a central role in modern ecological theory and application. For example, our understanding of succession is embedded in theories of modern community assembly and species coexistence (Chang & HilleRisLambers, 2016; HilleRisLambers et. al, 2012; Pulsford et. al, 2014), and has direct relevance to studies of landscape ecology, ecosystem development, restoration ecology, and global change ecology (Meiners et al., 2014; Prach & Walker, 2011; Walker & Wardle, 2014). Ecological succession clearly serves as a foundation for modern ecology.

Restoration ecology

The Society for Ecological Restoration (SER 2004) defines ecological restoration as, "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."Restorationists attempt to move the composition, structure, and dynamics of a damaged system to an ecological state that is within some acceptable limit relative to a less altered and (probably) more sustainable system (Falk 1990; Allen et al. 2002).

Ecological restoration can provide economic benefits (Blignaut et al., 2013; de Groot et al., 2013; Blignaut et al., 2014; ELD Initiative, 2015). A meta-analysis of restoration studies by de Groot et al. (2013) estimated that the restoration of grassland ecosystems could provide a benefit cost ratio of up to 35:1; this ratio would occur if the monetary value of the flow of additional ecosystem services, provided following restoration, were to be taken into account. Additionally, the employment benefits and subsequent flow-on effects of restoration are a valuable part of national economies. For example, BenDor et al. (2015) demonstrate that the ecological restoration sector in the US directly generates about 126,000 jobs and USD 9.5 billion in annual expenditure, along with a further 95,000 jobs and USD 15 billion of annual expenditure, indirectly.

2.2.1 Rehabilitation of Degraded Land Practice

Land Rehabilitation is an intervention a geo-ecological improvement. In most context this involves the mitigation or reversal of land degradation caused by poor land husbandry practice Martin (2003). The driving force for land rehabilitation is land degradation. Land degradation is a composite term indicating the aggregate diminution of the productive potential of the land, including its major uses (rain-fed arable, irrigated, rangeland, forestry), its farming systems (e.g. smallholder subsistence) and its value as an economic resource. This term, which includes the subset of "desertification", refers to the decline of the biological productive potential of land, namely the entire geo-ecological system that includes soils, waters, climate, vegetation, topography, and land use Martin (2003).

Rehabilitation treatments divide between those that treat the problems in the soil, usually by changes in land management, and those that treat the consequences of soil degradation, usually by engineering. In every case, since the fundamental causes of the land degradation are the social

and economic processes that drive human societies to abuse the land, the long-term success of any land rehabilitation intervention depends upon the changes in land management Martin (2003).

2.2.2 Restoration of Degraded Lands

There are many theories that recommend some methods for accelerated rehabilitation of degraded land and their biodiversity. The choice of methods for restoration may depend on a wide variety of social, economic, cultural, and biological, topography, climate and other environmental factors (Miller et al., 1995; MacDonald et al., 2002). Noticeably, the choice of method will have significant effect on the speed at which the restoration process proceeds. Actions to restore degraded lands may comprise the nurturing of helpful aspects and the removal of unfavorable conditions (MacDonald et al., 2002). Some studies classify ecological restoration into two categories, 'passive' and ‘active‘, depending on the degree of human participation (Allen, 1995; McInvar and Starr, 2001, as cited in Alemayehu D., 2009).

Passive Restoration Approach: A passive approach seeks to restore the ecosystem by leaving the land resources alone, with the anticipation that it will regain appropriate structure and function through natural succession, i.e. depending on the self-regenerating potential of ecosystems following the removal of degrading agents. Passive approaches are less effective for restoring highly degraded ecosystems and thus active restoration methods are often necessary (Laycock, 1995).An example of a passive technique is area closure (Tekle, 1998). In such a case, the land is kept away from human and livestock interference for a given number of years.

Active Restoration Approach: This approach involves active human intervention to complement and reinforce the self-regenerating potential of the natural environment. An example of this kind of restoration is grass establishment, tree planting and other biological and physical conservation. Severally degraded lands have a very limited self-regenerating potential that are rarely enough to initiate and expedite the restoration processes alone (passive approach), and thus there is a need for human action to achieve restoration. An active restoration approach involves active human intervention to complement and reinforce the self-regenerating potential of the natural environment. An example of this kind of restoration is grass establishment, tree planting and other biological and physical conservation.

2.3 Roles of Area Closure

2.3.1 Income and Local Livelihood Contributions of Area Closure

Natural resource livelihoods are all based on complex resource relationships, which shape and mould people's access to, use of, and control over, resources. Access to forest resources helps rural households diversify their livelihood base and reduce their exposure to risk. Earnings from forest products are often important as a complement to other income. Very large numbers of households generate some of their income from selling forest products, often when farm production is not enough to provide self-sufficiency year round. Income from forest products is often used to purchase seeds, hire labor for cultivation, or generate working capital for trading activities (Warner et al., 2008.)

As part of their fight against land degradation, communities in highlands and central parts of Ethiopia have started establishing closures, with the hope of preventing further degradation and promoting their re-vegetation. Establishing closures is considered advantageous since it is a quick, cheap and lenient method for the rehabilitation of degraded lands (Bendz, 1986).Furthermore, (Emiru Birhane, 2002) has made a conclusion that establishments of area closure has contributed a lot to improve livelihoods of local communities by ensuring their wellbeing and capabilities. Actually, in times of special hardship, and in the absence of a welfare state, the poor often look to the nearby forests and trees for the means to keep going. Although not as important overall as the goods that those families can produce from farming, trees and forests help families through the "lean season" between the end of one harvest and the next when food is short, or through periods of seasonal unemployment (Shimizu, 2006)

Utilizing natural resources in more sustainable way can improve community livelihood. In Ethiopia as soil erosion is the main cause of poverty, protecting soil at the site by restoration of vegetation cover in degraded hilly side can effectively disconnect the coarse sediment transfer by encouraging deposition and preventing sediment supply. It also tends to reduce flood transmission so attenuating flood peaks through increased roughness (Medihin Zewdu, 2002). Resource restoration (e.g. hillside vegetation) help maintain valuable ecosystem services, reduces flood damage, provides further benefits, and reinforced as a key building block of development support of the rural communities (GACGCS, 2005). In this sense,

community forestry has positive impacts on forest conservation and livelihood improvement of local people (Maheshwar and Misa, 2008). According to(Kindeya Gebrehiwot,2004)area closures have very high potential for agro forestry, especially with cash earning products like fuel wood, fruits, honey, when there is good access to markets.

According to Emiruet al.(2006), area closure known to improve ground vegetation cover, which in turn enhances better soil conditions, microclimate conditions and water percolation (Emiruet al., 2006). Longer time kept area closures can facilitate large numbers of woody species to grow in to higher height (Ambachew, 2006), and help woody species to have good population structure, inverted J-shape population growth with good regeneration (Kibret, 2008). Moreover, area closures are known that they provide forest products including trees that can improve the livelihoods of the rural poor though increasing incomes, improving food security, reducing vulnerability and enhancing well-being (FAO, 2001; Hengsdijk& Jansen 2006).

2.3.2. Biodiversity Conservation

The Convention on Biological Diversity encouraged the application of the ecosystem approach forthe restoration of ecosystems and natural resources. Land abandonment or systems of fallow are the common conservation strategies to promote restoration of biodiversity in degraded agricultural and grazing lands worldwide (Palik*et al*., 2000; Hobbs and Harris, 2001). Restoration of degraded lands reduces the loss of biodiversity. In the absence of restoration, the overall sustainability of ecological/ecosystem processes, including species diversity, will be further threatened. Recently in highland and central parts of Ethiopia establishment of ex-closures is emerging as a major and important practice to conserve vegetation biodiversity. Ex-closures have been effective in restoring plant species composition, diversity, biomass, cover, and structure of both herbaceous and woody vegetation, factors that normally lead to improved ecosystem function and acceleration of plant and animal diversity increase with time and where there is ex-closure; it is an inevitable to see green area (YaynishetTesfay, 2008; Tefera Mengstu , 2001). Different studies by different scholars also indicated that area ex-closures establishment has been used as a means to maintain biodiversity in different Woredas of the country including in Tigray region (KindeyaGebrehiwot,1997), Welo (KebromTekele, 1998 and Shewa (Tefera Mengestu, 2001; Abiyou Tilahun *et al*2015). High levels of biodiversity of species in ecosystem typically characterized that ecosystems healthy and integrity. Species highly utilized by

community and their livestock are becoming lower in number and lead to probabilities of being threatened. For these reasons reclamation of degraded land through area closure can promote sustainable development and ecosystem health through reduced erosion, increased biological productivity, water and soil quality (Aradottir*et al*., 2000).

3.3.3 Soil Erosion Protection and Enhancing Productivity

The topography of Ethiopia is dominated by high land. In the highlands case, the decline of soil fertility and severe soil erosion is due to water outflow on steep and fragile land that has been under intensive farming (Aklilu Amsalu and Jan de Graaff, 2006). The major difficulties in the highlands were erosion on steep slopes and poor drainage. According to Aklilu Amsalu and Jan de Graaff (2006), the major causes of soil erosion mentioned by farmers included erosive rains, steep slope, damaged conservation structures, and tillage, which makes the soil loose and bare. The amount of annual soil movement (loss) by erosion is estimated to range from 1,248– 23,400 million tons per year from 78 million ha of pasture and rangelands and cultivated fields throughout Ethiopia (Beyene Fekadu, 2009). As the bare land covered with vegetation largely influences the infiltration rate, followed by the permeability and structure of the underlying soil. For example, soils with good structure absorb water quickly, and minimize surface runoff. Soil structure determines how easily the particles detach to start the erosion process. Steeper sites provide energy for the scouring action of surface water run-off. Maintaining good ground cover lessens the effect of all erosive forces. While plants absorb the impact of raindrops, their litter and roots enhance infiltration and hold soil in place (Wild, 1993). Soil resources without appropriate conservation measures, resulting directly to the changes in particle size distribution through removals by sheet and rill erosions (Toy *et al*, 2002). Rapid vegetation restoration through area ex-closures is an efficient measure for soil and water conservation because of its increased capacity for infiltration and sediment trapping. Closures are important to increase water holding capacity of the soil under tree canopy and the availability of water is 1.5 to 2 times more under closures than grazing land at the depth of 0-20 cm (Kamara *et al*, 1992). If vegetation coverage is chosen to be the best alternative form of land use, not only it prevents the loss of soil, but also reduce soil deposited in river bottoms, lakes and dams via siltation (FAO, 2001). Restoration evolves returning native species to an area, stabilizing soil and reducing soil erosion. The influence of trees in soil physical properties is also very important in augmenting

the overall capacity of the land to be productive. Currently in Ethiopia, area closures are playing an important role in conserving the remaining vegetation and soil resources and improving soil fertility. They improved soil fertility by adding soil nutrients from decomposed plant remains. Area ex-closures also reduced nutrient loss from a site by controlling runoff (vegetation acting as a physical barrier to soil erosion) and promoting natural regeneration of plants and reducing land degradation of formerly degraded communal grazing lands. This eventually improves the capability of the land to support other vegetation types, including exotic plantations and/or support livestock (Tefera Mengistu*et al*., 2005; Wolde Mekuria and Aynekulu Ermias, 2011).

2.4. Area Closures and Perceptions of Local People

Local people's perception refers to local peoples' attitudes and understandings that reflect their habitual way of life, as well as their shared expectations (Muhammad, undated). All societies possess a substantial body of beliefs, knowledge and practices built around their everyday life experiences and their surrounding environment (Muhammad, undated; Elias, 2004). In the context of this study, farmer's perception to area enclosure practices refers to individual farmer's evaluation or awareness, opinion, feeling to the process of the practices which is associated to their socio-economic and environmental characteristics.

2.5 Challenges of Area closure

The challenges of area closure development practices are: inadequate involvement of communities; poorly defined rehabilitation objectives; lack of management plans; unclear responsibilities and benefit-sharing arrangements; and poor cultural practices, devolution of management responsibility; clear definition of responsibilities and benefit-sharing arrangements; and better tenure security, which are all major factors to success (Tefera, et al., 2005)

2.6 Empirical Literature Review

The study by Gidey et al. (2021) conducted in three closure areas selected from three Wored as of Tigrai regional state in Ethiopia revealed that closures have a positive effect in improving animal feed, mitigating microclimate of the community, and enhancing crop production and productivity of the community through increased water discharge and decreased soil erosion. Furthermore, it provides farm equipment and fuel wood.

A study conducted by Endale et al (2020) in Sire Mores area closure, Hidabu Abote Woreda, North Shewa zone, Oromia Regional State with the objective of evaluating the effects of area closure on selected physic-chemical properties of soils showed that physical and chemical properties of soil in area closure areas are improving as well as area closures act as important sinks of water and reduce soil erosion in the study area. From their study they concluded that area closure improves soil physical and chemical properties.

Mohammed et al (2015) carried out a study in degraded lands in Central Rift Valley area of Ethiopia with aims of assessing the woody species composition, structure, regeneration, density and diversity in the area closures and in an open area and to assess the socioeconomic importance of area closures to the local communities. The result of their study revealed that the area closures in the Central Rift Valley brought changes by rehabilitating degraded lands and eventually brought economic, social and ecological benefits to the local communities. The majority of the local people (85%) expressed positive attitude towards the benefits of area closures in rehabilitation woody species in the area. About 65% of the respondents confirmed that they had benefited from the area closures in one way or another.

According to the reports from case studies conducted on closure in the central and northern highlands of Ethiopia; area closure had twice the plant species richness and diversity value compared with communal grazing lands after 22 years of closure establishment (Tefera et al., 2011) and an increase in soil organic matter of 1.1% and total Nitrogen of 0.1% after 10 years of closure establishment (Mekuria, 2011; Mekuria, 2013). Also, a considerable decrease in soil loss was reported after the establishment of area.

A study conducted in Ethiopia in Biyo-Kelala Area Closures in Ada`awereda of Oromia regional state by Meron (2010) showed that income generated from the area closure product contribute higher amount to the poor households but lower to the rich ones. The study further showed that area closures not only play potential role in enhancing the recovery of vegetation diversity of degraded areas but also contributes to household income.

2.7 Conceptual Frame Work of the Study

As shown in Figure 2.1, the implementation of landscape restoration by way of community based area closure affects the livelihood of people, size of cultivated land, the land cover including the

vegetation cover, soil fertility and productivity. The figure presented below depicts that landscape restoration occurred due to the area closure is the cause for land cover change, livelihood diversification and reduction of soil erosion. The land cover change leads to the increase in conservation of vegetation, the increment in income from the production of crops, fruits and vegetables, an increase in income sources, a change in society and an increase in environmental conservation. These changes in livelihood activities of people have contributed positively to conservation of the environment.

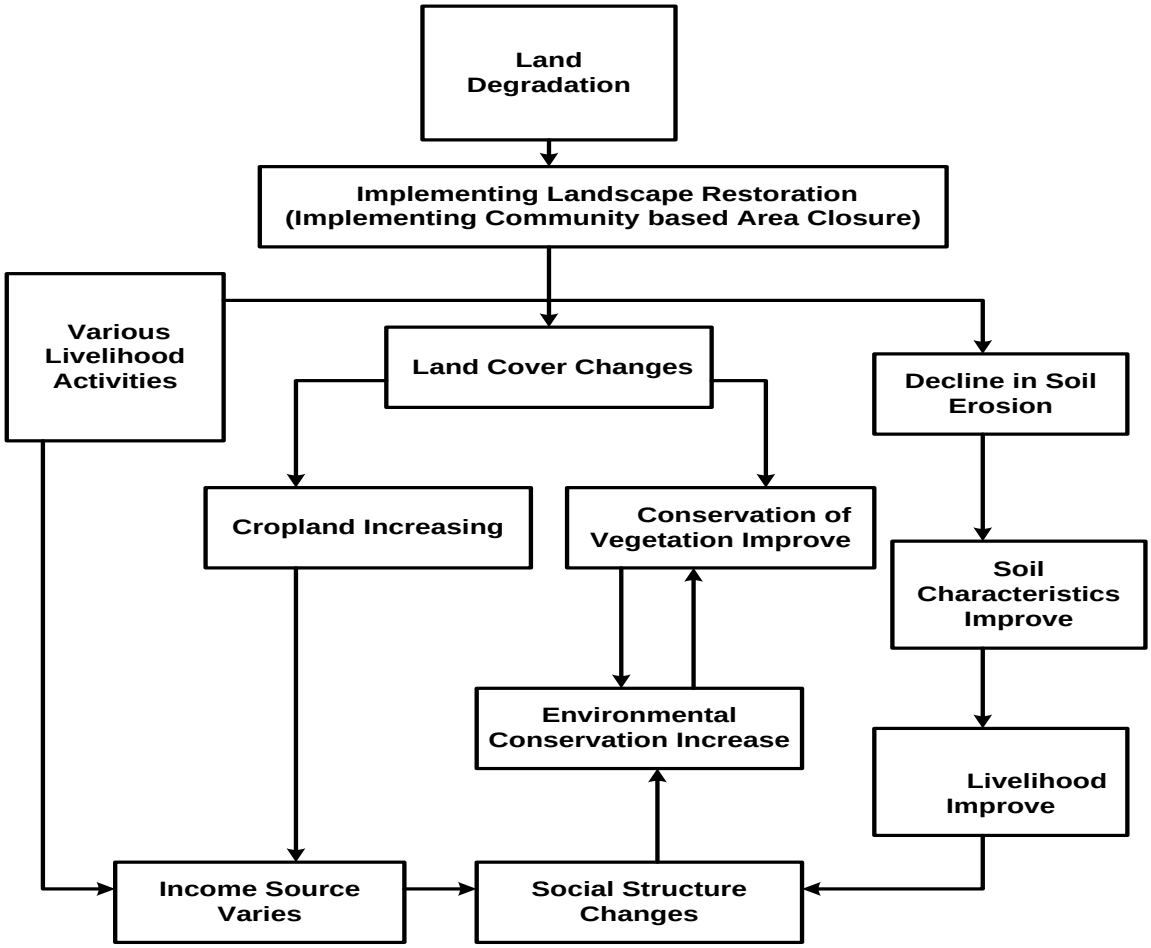


Figure 2.1. Effects of landscape restoration on the environment and community

(Adapted from Zhen et al., 2014)

CHAPTER THREE

METHODOLOGY

3.1 Description of the Study Area

3.1.1. Location, Size and Topography

The study area is situated in Oromia Regional State of Ethiopia at East Shewa Zone, Boset Woreda and located on the road to Djibouti at about 125 KM to the East of Addis Ababa, the capital of the country and the region. The Woreda is found in Awash major catchment area in which geographically located between $8^0$25'-$8^0$50'N latitude and 39^o 16'-39^{o}50'E longitude. The agro-ecological zone of the Woreda is characterized by kola 79%, Woyina Dega 20% and Dega 1%. The Woreda has 42 *kebele*s (33 rural *kebeles* and 9 urban *kebeles*) with a total population of 217,132 of which 118,676(54.6%) and 98,456 (45.4%) of the Woreda population are male and female respectively (Boset Woreda Finance and Economic Office, 2020). The Woreda has an altitude ranging from 1085 to 2342 meters above sea level. The land in this Woreda shows that 30.6% is arable or cultivable, 7% pasture, 51.2% bushes, 0.1% forest, 1.4% houses and the remaining 9.7% is considered degraded or otherwise unusable (WoANR, 2016). From the total 43,457 hectare, crops produced in the Woreda include 30% maize, 18% haricot bean, 3% wheat, 31% teff, 8% sorghum, 3% barely, 2% chickpeas 1% Lentils, 1% Faba beans, 1% Field pea and 2% vegetables and sugar cane and livestock population 681,518 are the most important means of livelihood (WoANR, 2016). The Woreda has the minimum and maximum temperatures of 16.6 and 31°C respectively (NMSA, 2015). It has a mixed crop– livestock farming system (CSA, 2013).

3.1.2 Geological Structure and Mineral Resources

The current rock distributions of the Woreda are the result of past geologic history and tectonic movements of the horn of Africa, of which Ethiopia, Oromia and East Shewa Zone are parts. Thus, the Precambrian era estimated to cover 4.5 billion years to 600 million years ago. This era was characterized by series orogenic volcanism and gradational processes which formed the bases of continental land mass, of Gondwana land; the present base rock of Africa continent. Furthermore different rocks were occurred in Paleozoic, Mesozoic, Cenozoic eras.

3.1.2 Relief, Rivers, Climate and Soil of the Woreda

Nearly 90% of Boset Woreda is found below 1500 meter above sea level with the exception of the northwestern extreme part which has an elevation that range 1500-2300 meter above sea level. In general, the Woreda is dominated by flat land with rolling and undulating features in places. The highest relief feature however is Boset Guddo, with 2247 meter above sea level elevation. Smaller hills include Bericha, Dalecha Gada, Jimijima, Tulu Dhimtu and Gorora.

The Awash River is the significant river in Boset Woreda, which forms the boundary between the Woreda and Arsi Zone, and is the main source of irrigation activities such as for the Nura Era fruits and Vegetables production. It's also source of irrigation of fruits and Vegetables cultivation by small and medium scale farmers as well as sources of drinking water for human and animals. The Tebo River also flows into Boset Woreda from northwestern direction, in the neighboring Region 3, Minjar Woreda. Compared to the Awash River , it is much smaller in volume.

Most part of Boset Woreda about 89% belongs to tropical (Grammojji/Kolla) Agro climatic zone and the remaining smaller section about 11% is sub-tropical (Badda Daree/woina Dega). Average annual temperature varies between 25- 300 c for the tropical and 15-200c for the sub-tropical part of the Woreda. Annual average rainfall is between 700-800mm. The climate is suitable for agriculture especially for cultivation of crops like maize, sorghum, teff.

Major soil types of the Woreda are Andosols, which cover 748.44 Km2 11.35% and Fluvisols 46.87 Km2 3.10% of Boset (Boset Woreda Agriculture and Natural Resource Office, 2021). Irrigation backing is required to compensate for the low water holding capacity of Andosols so as to make them sustainable for cultivation. The major soils of Boset, Andosols, though have low water retention capacity, are quite productive especially during periods of sufficient rains. Lithosols due to low depth often become moisture stress and as a result have limited agricultural potential.

Combisols and Luvisols, belong to one category of soils. Cambisols, though young compared to most tropical soils, in places lack of cementation, hilly relief and stoniness as well as weak structure (poor aggregate) limit their agricultural productivity. Even though most Luvisols have problems related to root distribution, which limits their agricultural potential, in relation to most

tropical soils, they are good agricultural soils. On steep slopes such soils are however UN productive for cultivation.

Fluvisols, cover the eastern part of the sub-Woreda, along the course of the Awash River. If irrigated and properly handled, are proven to be very productive with considerable agricultural importance than other soils. They are ideally suitable for rice, sugar cane and vegetables but are subject to water logging and flooding during the rainy season.

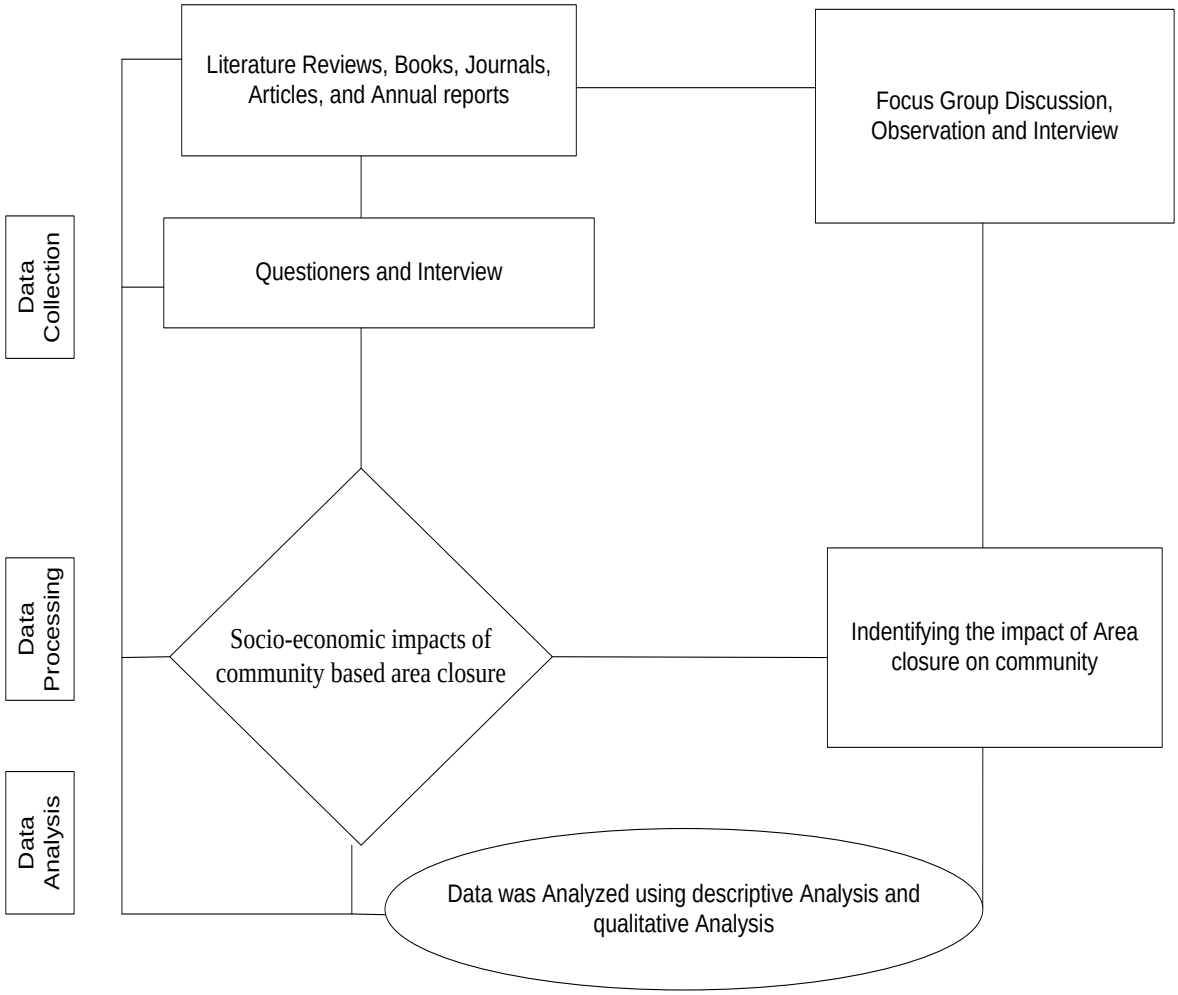
3.1.3 Vegetation and Wildlife

The major types of the vegetation in the Woreda is coniferous forests of podocarps variety which covers 671.88 km2 or 44.385 of the total surface of Boset followed by woodland and savannah of mixed deciduous 375 km2 or 24.77% and acacia 234.38 km2 or 15.47%. grassland of chrysopo ganaucheria and Dactylocternium scandium account for 232.81 km2 or 15.38% of the area of Boset.

Major species of wild animals in BosetWoreda are monkey, ape, warthong, hyena and deer. Although the prime objectives of the Nazareth fuel wood plantation are the production of fuel wood, the forest serves as shelter for some species of wild animals.

3.2 Research Design

Though much emphasis was given to quantitative approach, this study followed a mixed research design. The researcher used mixed research approach for the purposes of triangulations of data and analysis methods. The researcher also used the sequential transformative method which helps to collect and analysis either quantitative or qualitative data first and next integrating results into the interpretation phase. The research methodological Framework of the study is presented in Figure 3.2 below.



(Source: Researcher own design, 2021)

Figure 3.1: Research Methodological Frame Work

3.3 Target Population

The target population of the study were be all households' residence in four *kebeles* (Osole , Kombie , Buta Bedaso and Buta Dalecha Geda *kebele*) of Boset Woredas. As of December 2020, these *kebeles* had a total of 1,224 households (Boset Woreda Agriculture Office, 2020). Due to time and resource constraints it was difficult to study the entire target population of the study and selecting a sample was necessary. According to Sekeran (2006) sample defined as a portion of the population that represents the entire population. Even though, including all households thoughts on the analysis would have been better for conclusion and generalization, economically and operationally, it is very difficult to contact all households in the research.

Therefore, taking a representative sample of the population of the households is feasible to conduct this study

3.4 Sample size and Sampling Technique

The sampled households were taken from four different *Kebeles* in Boset Woredas, which includes Osole Kebele, Kombie *Kebele*, Buta Bedaso *Kebele* and Buta Dalecha Geda *Kebele*. The four *kebele*s were purposefully selected because of the availability of area closure, which is the concern of this study. The total number of household in in the selected four Kebeles is estimated to be 1,224 households (Boset Woreda Agriculture Office ,2020). The sample size was determined following two steps sample calculation procedure: in the first step, sample size was determined for infinite population using Yamane (1967) sample size determination formula with 95% confidence level and in the second step, actual sample size for each *kebele* was determined by applying selected using proportionate stratified random. This is presented as follow

$$n = \frac{N}{1 + (N \cdot e^2)}$$

Where,

n is the sample size,

N is the total household size of the selected *Kebel*es and

e is the acceptable margin of error.

According to Boset Woreda Agriculture Office (2020) the total number household residing in the selected four *Kebeles* is estimated to be 1,224 households. Therefore, the sample size is calculated as

$$\text{n} = \frac{1224}{1 + (1224 \text{ x } (0.05)^2)} = 301$$

Then, the samples contain 301 household were selected using proportionate stratified random sampling from each stratum (*kebeles*), where the entire population is divided into subgroup or

strata of four *kebele*s. Following Kothari (1999) and Cochran (1997) sampling procedures from each *kebeles* or stratum, the samples can be taken using the formula

$$n_i = \frac{n \times N_i}{N}$$

Where

N - Total Population size = 1224

n - Sample size = 301

N_i -The size of i^{th} stratum

n_i - The number of participants selected from the i^{th}stratum (*kebeles*) and i = 1, 2,...,4

Hence, the distribution of samples was taken from four different *Kebeles* in Boset Woreda, which includes Osole Kebele, Kombie *Kebele*, Buta Bedaso *Kebele* and Buta Dalecha Geda *Kebele*, is given as follows.

Table 3.1 Sample Distribution

S.N	Name of *Kebele*	Number of households	Proportion of the sample
1	Osole	308	76
2	Kombie	310	76
3	Buta Bedaso	298	73
4	Buta Dalecha Geda	308	76
	Total	1224	301

Source (Own Computation, 2021)

Therefore, according to the above calculation a total of 301 questionnaires were distributed to collect relevant data from 301 households in above mentioned four *kebeles* of Boset Woredas. Study participants were selected by using systematic random sampling technique. The sampling

interval (I) was calculated as I=N/n which implies 1224/301= 4. Thus the data was collected from the households as per this sampling interval.

In order to substantiate data collected from these respondents, a focus group discussion was held with another ten (10) respondents from each *kebeles*. The participants of the focus group discussion were purposely selected form the four *kebeles*. During the focus group discussion, questions that were believed to be best in eliciting personal opinion on the socioeconomic benefit of community based area closure were forwarded to the group and opinions of the respondents were gathered accordingly.

3.5 Data Collection Instruments

The primary data was obtained from both quantitative and qualitative data sources. The secondary data was obtained from published and unpublished sources of the governmental and the non-governmental organizations, and from relevant websites. The detail of data collection instrument is presented as follows.

3.5.1 Semi Structured Questionnaire

In order to a quantitative data a semi-structured questionnaire was developed and administered for 301 randomly selected households. A semi structured questionnaire was designed and employed to generate data from respondents. To further ascertain data collected through primary data collection methods, various household head characteristics such as, sex, marital status, age and educational status, as well as household socioeconomic characteristics such family size, sources of livelihood, landholding size, number livestock owed by household, crop and livestock production system and the contributions of community based area closure on the socio economic benefit of the randomly selected households.

3.5.2 Focus Group Discussion

In this study, a focus group discussion was used to collect qualitative data and accordingly an open ended focus group discussion guide was prepared and utilized to gather data about the individual's perspectives on the impact of the area closure pertaining to the life of the households, and to obtain deeper understanding of the socio-economic impact of area closure on

the life of the nearby community. Therefore, one FGD group in each *kebele*; a total of four was organized comprising each with 10 members.

3.6.2 Secondary Data Sources

In this study, the information derived from the secondary sources of data were collected from different sources such as published and unpublished materials which include previous research works, books, office documents, websites, journal articles written by different scholars on the issues of area closure, and so on, which will helpful to the completion of the study.

3.5 Methods of Data Analysis

The quantitative data collected for the study were analyzed using descriptive statistics such as mean, standard deviation, frequency table and percentage. Moreover, the qualitative data collected through focus group were reviewed and narrated for analysis. The cumulative combination of all these methods was believed to be helpful to understand and analyze the socio-economic benefit of community based area closure.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Demographic Characteristics of Household Head

In this section, it is intended to discuss sex, age, marital status and literacy level of the respondents. The data presented in section are assumed to be essential so as to interpret or understand the subsequent chapters of the thesis since landscape restoration by mean of community based area closure and livelihood are the functions of the demographic and socioeconomic characteristics of households. Table 4.1 below shows that about 72% of the sampled households were male headed households while 28% were female headed households. This indicates that the proportion of male household heads is larger than that of females. The highest proportion of respondents was observed within age group of between35-44 years (47.8 percent) followed by age group 45-54 years (17.6%) and age group 45-54years (17.6%). Only 6% of the respondents aged 65 years and above. This indicates that the majority (94%) of the respondents were in active working age. the active working age household head can spent more efforts on area closure measures compared to older one. Despite younger household head are more likely to adopt agricultural technologies, age of the household-head can have a negative or positive influence on adoption of area closure activities.

Table 4.1 Demographic Characteristic of Respondents

Variable	Categories	Frequency	Percent
Sex	Female	85	28.2
	Male	216	71.8
	Total	301	100.0
Age	15-24	3	1.0
	25-34	48	15.9
	35-44	144	47.8
	45-54	54	17.9

	55-64	34	11.3
	≥ 65	18	6.0
	Total	301	100.0
Marital Status	Single	27	9.0
	Married	270	89.7
	Divorced/Widowed	4	1.3
	Total	301	100.0
Literacy Level	Illiterate	27	9.0
	Primary	250	83.1
	Secondary	21	7.0
	Higher Education and above	3	1.0
	Total	301	100.0

(Source: Own computation, 2022)

As study findings showed 90% of the household head were married and the rest were found unmarried and divorced/widowed. Marital status could contribute to difference in production between the married and unmarried respondents in that, household with a married couple tends to have more labor capital advantage. This is because variation in the type of marital status has got direct implication on the size and structure of households and families (Tegegne, 2014). This result is in consistent with the general truth because marriage in general is most of the time the base for the increase in number of births (Ayele, 2019). As educational status of a household head increases, it is assumed to increase the transfer of relevant information among them and as a result increase farmers' knowledge about the cause, severity and consequence of land degradation (Miheretu and Yimer, 2017). Education enables farmers to rehabilitate/ restore degraded lands through establishing area closures in their localities.In order to get vivid picture of literacy level of the household heads, detailed categories were made and summarized in Table 4.1. The result shows that majority (83.1%) of the sampled household head are educated up to primary school followed by illiterate household heads 27(9%).The remaining 7% and 3% of

them are educated up to secondary school and diploma holder respectively. The higher the literacy rate shows the higher the respondents to perceive new information or use technologies that improve productivity and quality of their goods and services (Miheretu and Yimer, 2017).

4.2 Household Characteristics

Family size has to be one of the most important characteristics to be examined to know how much of the family's income is used for consumption (Arega, 2013). The study findings revealed that the average household size of the respondents was 5 with a minimum and maximum of 3 and 9 household sizes respectively. According to the 2016 Ethiopian demographic and health survey, the average household size in Ethiopia is 4.6 members (EDHS, 2016). The Average household size of the sampled household is almost similar with the national average family size. Households with larger household size imply more human capital in terms of labor to adopt more area closure measures.

Household heads were asked to state their most important sources of livelihood. Data collected in this regard were summarized in Table 4.2. The majority of the surveyed households were dependent on rain feed agriculture (85.7%), irrigation (11%), both rain-feed and irrigation based agriculture (1%) and very few livestock (1 %) purely depend on livestock production and the 1.3% of households relied on off-farm seasonal work.

Table 4.2 Households' Income (Source of Livelihood)

Responses	Frequency	Percent
Rain-feed agriculture	258	85.7
Irrigated agriculture	33	11.0
Both Rain-feed and Irrigation	3	1.0
Livestock	3	1.0
Off-farm activities	4	1.3
Total	301	100.0

(Source: Own computation, 2022)

Livestock as part of mixed farming system is paramount important to a household livelihood. Livestock plays an important role in the farming system of the area. Cattle, sheep and goat, and chicken are kept by farmers for income source, draft power and food (milk, meat, egg). The average livestock holding for sample households was 6.12 with maximum of 24 and minimum of

The research then sought to examine the land use pattern of the household in the study area. Accordingly, the communities in the study area have mainly two major land use systems that are the rain-feed farm and grazing land (Table 4.3).

Table 4.3 Land-Use Type Composition of the Households

Responses	Frequency	Percent
Rain-feed	221	73.4
Irrigation	33	11.0
Both Rain-fed and Irrigation	3	1.0
Grazing land	40	13.3
Closure area	4	1.3
Total	301	100.0

(Source: Own computation, 2022)

The mean landholding size of the respondents was 1.63 ha per household; with the standard deviation of 0.64. The survey made by CSA and WB in 2013 incorporating 3,969 households residing in rural and small towns of Ethiopia indicates that the mean landholding size of farm households of Ethiopia is 1.37 ha. This is implies that landholding size of the sampled households in the study place is above to the national average.

4.3 The Local People Perception towards Community Based Area Closures

The study needed to understand the local people perception towards community based area closures. The respondents ‘reactions in this regard are presented in as follows.

Table 4.4 confirmed that the areas now under area closures were seriously degraded before the establishment of area closure. Respondents were asked to identify the major causes of deforestation in their locality. Out of all the interviewed households, 58% of them pointed out that cutting tree for fuel wood were mentioned as the major reason for vegetation loss in the area.

Table 4.4. The major causes of vegetation loss in the study area

Responses	Frequency	Percent
Agricultural expansion	21	7.0
Cutting tree for construction	49	16.3
Cutting tree for fuel wood	174	57.8
Cutting tree for farm implements	16	5.3
Unwise exploitation	41	13.6
Total	301	100.0

(Source: Own computation, 2022)

The sampled household further emphasized that, as a result of the above factors vegetation cover of the area has decreased and land degradation increased which indirectly results in severe soil and water erosion. This eroded crop lands and flooded the crop field by floods and reduced productivity of the area as well as adjacent farm lands.

4.3.2. Local People Perception on why Area Closures Established

From the focus group discussion, it was found that reason to establish area closures was to the enhance crop production through increasing soil fertility, to improve animal feed and reduce runoff, and to increase water availability. Similarly, the majority (60%) of the sampled households confirm that basic reason to establish area closures was to rehabilitate/restore the degraded areas and the rest 40% of them believes that the area closure was established to restrict the local community from accessing land. This result confirm with Mengistu, (2001), whereby the major objective behind establishing area closure wasto halt and reverse land degradation to

check the adverse effect of runoff, improve the micro climate and create conducive atmosphere for humans and livestock by maintaining environmental stability in the trees, shrubs, herbs and grasses.

4.3.4. Local People Perception on Criteria for Site Selection of Area Closures

Respondents were also asked to identify the criteria used to establish area closure. Their responses were summarized in the following Table 4.5.A large proportion of respondents (66.4 percent) believe that the more degraded was the first to be closed, followed by those who believe that the more accessible was the first to be closed (16.9 percent) and those who believe that the more area covered was the first to be closed (16.6 percent).

Table 4.5 on what basis is the site to be closed selected?

Responses	Frequency	Percent
More accessible first closed	51	16.9
More degraded first closed	200	66.4
More area covers the first to be closed	50	16.6
Total	301	100.0

(Source: Own computation, 2022)

4.3.5. Communities Perception During and After Area Closure

Table 4.6 presents respondents 'opinion during and after area closure establishment in their locality. A large proportion (60.13%) of them replied that they felt negative about area closure during the establishment period, 22.92% of them replied that they felt positive about the establishment of area closure and the rest of them felt neither positive nor negative during its establishment period. This study verified that most household included in the study felt negatively about are closures. This might be due to lack of awareness about the benefit of area closure. However, after its establishment the negative perception of the study participants changed dramatically about the area closure. The reason for this was most likely associated with

the multidimensional benefit they gained from the area closure in their respective area. Furthermore, the focus group respondents stressed that enclosures are effective land management options that promote surface cover and mitigate soil degradation resulting in enhanced land value and productivity. This positive attitude of local communities is fundamental for the sustainability of enclosures (Heitschmidt et al., 2004) and also for future rehabilitation projects (Wolde Mekuria et al., 2009).

The study participants were also asked to indicate initiators for the establishment of area closure in their locality. Majority (64.5%) of them responded that area closure establishment was initiated by government and the rest 35.5% responded that the area closure in their locality was established by the nongovernment organizations. Concerning the protection of the area closures, majority (48.2%) of the respondents thought that the local community was responsible, while 30.9% of the respondents felt that the government was responsible, and the remaining 20.9% felt that the nongovernment organization were responsible for the management of area closures. Another important point to be considered in an effort to assess the impact of area closure was to learn about the households' willingness to protect additional area closure in the future. It is evident that majority (96.3%) of the sampled households in the community had showed interest to establish additional area closure in the future.

Table 4.6 respondent's perception of the level of their participation during area closure establishment

Feeling of respondents about Area Closure during Establishment	Frequency	Percent
Positive	69	22.9
Negative	181	60.1
Neither	51	16.9
Total	301	100.0
Feeling after establishment of Area closure?	Frequency	Percent
Positive	301	100.0

Negative	0	0
Who initiated area closure?	Frequency	Percent
Government	194	64.5
NGO	107	35.5
Total	301	100.0
Who is primarily responsible for the area closure protection?	Frequency	Percent
Government	93	30.9
Community	145	48.2
NGO	63	20.9
Total	301	100.0
Are you willing to establish additional area closure in the future?	Frequency	Percent
No	11	3.7
Yes	290	96.3
Total	301	100.0

(Source: Own computation, 2022)

4.4 Socio Economic Contributions of Community Based Area Closures

Are closure are expected to have an effect in livelihood improvement by increasing in water availability which allows production of cash crops, improved soil and water management leads to higher yield, integration of forage development. An attempt has been made to assess the effect of area closure on the community's livelihood condition which measured in terms of income. The socioeconomic contribution of community based area closure is discussed below.

4.4.1 Agricultural Productivity Before and After Area Closure

In order to have a better understanding on the benefit of area closure on agricultural productivity in the study area, the sampled households were given different question in this regard and the

result of the assessment is presented in Table 4.7. About 82.4% of the households responded that they have had agricultural land adjacent to the area closure and the rest 17.6% of them responded as they didn't. Off those sample households who have agricultural land adjacent to the area closure, majority (66.1%) of them started to use the land adjacent to area closure since 2 year, the rest 19.8% and 14.1% of them started to use their adjacent land before 1 year and 5 years respectively. Comparison of the agricultural productivity pre and post establishment time of area closure revealed that, 97% respondents perceived that there is a difference in crop production before and after the establishment of area closure. Before the establishment of area closure the status of agricultural land productivity was very bad. However, after the establishment of the area closure the agricultural productivities increased significantly. The respondents from the FGD also confirmed that the presence of area closure increased crop production by reducing water runoff and enhancing moisture of the soil. Furthermore, about 90% of the respondents perceived that their crop yield increased significantly after the establishment of area closure (Table 4.7). According to the respondents the main reasons for increment of crop yield were due to the decrement of soil erosion (76.8%) and rehabilitation of gullies (23.2%). Likewise, among the sampled respondents with whom the focus group discussion was held, almost all of them reported that the presence of area closure in their locality, increased productivity of their farm land, reduced soil erosion, rehabilitated the degraded lands, increased the aesthetic value of the soundings, increased the availability of food for livestock. The sampled households in focus group discussions further reveal this situation by explaining that, before the establishment of area closures farmers had been facing serious erosion problems on their farmland and as result, they had losing large amount of their crop land soils and cultivations however erosion rate is becoming very low after restoration of vegetation due to closure area. This fact was consistent with the findings of Mekuria et al. (2017) who indicated that area closure can improve local communities' livelihoods beyond the ecological rehabilitation of the degraded lands. It brought an increased crop production by reducing water runoff and enhancing moisture of the soil. In line with this, Mengistu and Mekuria (2015) indicated that area closures were effective in promoting vegetation cover and reducing soil erosion and thereby enhancing land productivity. Moreover, Wolde et al. (2007) witnessed that the majority of respondents involved in their study rated area closure' role as important. This, in turn, is also important for protecting farm plots from soil erosion by reducing run off. The observations of most of the study participant on area closure

effectiveness to increase crop productivity was also agree with the works of Aklilu and Graaff (2006) in the central Ethiopian highlands, Dejene et al. (1997) in Tanzania and Visser et al. (2002) in Burkina Faso. However, there were also households who disagree on the contribution of area closure in increasing crop yield. About 10 percent of the respondents did not realize the contribution of the area closure in crop yield (Table 4.7). This finding was consistent with the findings of G. K. Mezgebo et al. (2021) who indicated that about 37 percent of the respondents did not realize and sensitize the contribution of the enclosures in crop production in their study place

Table 4.7 Perception of respondents of Agricultural Productivity Before and After Area Closure

Is your Agricultural land Adjacent to the closed area?	Frequency	Percent
No	53	17.6
Yes	248	82.4
Total	301	100.0
If yes when did you start to use the land adjacent to area closure?	Frequency	Percent
before 1 years	49	19.8%
Before 2 years	164	66.1%
Before 5 years	35	14.1%
Total	248	8239.2%
What was the status of your agricultural land before the establishment of area closure?	Frequency	Percent
Very Bad	109	36.2

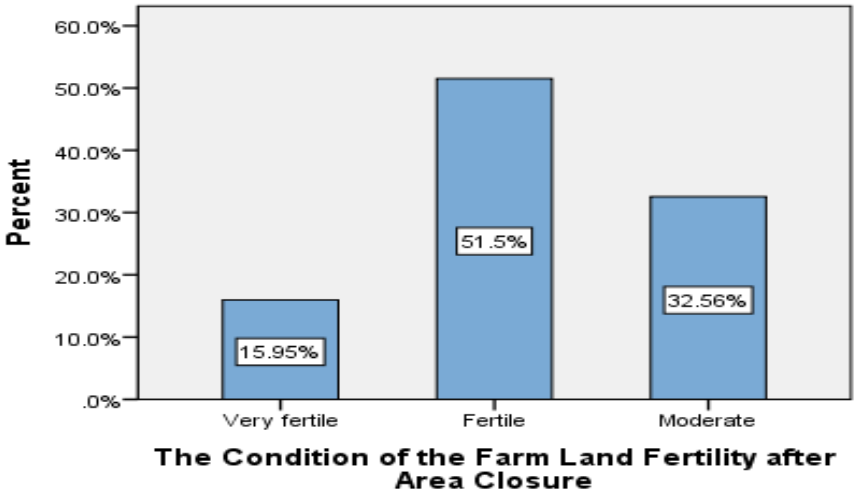
Bad	136	45.2
Moderate	39	13.0
Good	17	5.6
Total	301	100.0
How do you compare your Agricultural land productivity with agricultural land adjacent to the closed area	Frequency	Percent
Very Bad	0	0
Bad	0	0
Moderate	9	3.0
Better	292	97.0
Total	301	100.0
What did you observe about crop yields on your farmland after area closure	Frequency	Percent
Increased	271	90%
No Change	30	10.%
Total	301	100
If increased what do you think is the reason?	Frequency	Percent
Since the adjacent area closed, erosion is minimized	208	76.8%
Since the adjacent area closed, Gullies	63	23.2%

rehabilitated		
Total	271	1

(Source: Own computation, 2022)

4.4.2 The Contribution of Area Closures to Farm Land Fertility

Change in farm land fertility after the establishment of area closure in the study area was among the parameter examined in this study. Data collected in this regard were summarized in the Figure 4.1 below.



(Source: Own computation, 2022)

Figure 4.1 Contribution of Area closures to local livelihood through Farm Land Fertility

The data obtained from the focus group discussion revealed that the area closures have direct benefits on the fertility of the soil. The contribution of the area closure in enhancing crop production and productivity through improvement in soil fertility was perceived to be significantly important, particularly as compared to the productivity of the farm lands before the degraded land was closed for rehabilitation. Furthermore, the majority (51.5%) of the surveyed respondents also perceived that their farm land became relatively fertile after the establishment of area closure followed by 32.56% of them who responded their farm land became moderately fertile and the remaining 15.9 % of the respondents replied that their farm land became very fertile due to the area closure. The result of this study is in line with a study conducted by Endal

et al. (2020) that showed area closures were effective in restoring the nutrient status and quality of degraded soils. The result of this study further showed that physical and chemical properties of soil in area closure areas as well as its fertility showed an improvement. Previous studies (such as Abenet et al., 2016; Gebrehaweria et al., 2016; Wolde et al., 2017) witnessed that area closure being integrated with physical and biological conservation measures improve soil fertility by arresting soil erosion and adding litter and increasing above-ground biomass. This, in turn, leads to increase in soil depth and moisture content. Consequently, the productivity of the plot enhances that can also have positive impacts on farmers' livelihood.

4.4.3 The Contribution of Area Closure on Bee Keeping

Out of the total sampled households, 60 (19.9%) households dwell near the area closure were bee keepers and of these 58 (96.7%) of them said that their honey production is increasing after area closure and the rest 2 (3.3%) said they didn't saw any change in their honey production after area closure. This indicates that the area closure has positive contribution on the honey producers in the community. Data obtained from FGD participant also confirmed that, there were households that involved in beekeeping production within the area closure. This is due to the fact that area closure supports the regeneration of flowering plants which could serve as bee forage.

Table 4.8 Contribution of Area closure on bee farming

Do you have beekeeping?	**Frequency**	**Percent**	**How Do You Evaluate Your Honey Production After Area Closure?**	**Frequency**	**Percent**
No	241	80.1%	Increasing	58	96.7%
Yes	60	19.9%	No Change	2	3.3%
Total	301	100.0	Total	60	100%

(Source: Own computation, 2022)

4.4.4 Other Contributions of Area Closure

Most of household surveys in Ethiopia capture conventional rural activities, such as crop production and livestock rearing, and rarely incorporate incomes from environmental resources. The goods and services provided by environmental resources, such as forest products, are often omitted. This is because forests or grasslands tend to be either communally owned or, if privately owned, not expressly cultivated. As a result, there is a substantial gap in our understanding of the actual socioeconomic contribution of environmental resources, the functioning of rural economies and the extent of rural poverty and inequality (Bedru et al, 2010).In the study area as indicated above, people are engaged in extracting construction materials from area closure such as grass, fodder, fuel wood and medicinal plants and they are earning incomes from sale of these products which supports their livelihoods. This is also true aboard and in other areas of the country as verified by other researchers which indicated that incomes from environmental sources play an important role in rural livelihoods in developing countries. Particularly, products from forest products contribute significantly to rural households' economic wellbeing (Reardon and Vosti, 1995; Reddy and Chakravarty, 1999; Fisher, 2004, Getachew et al.2007).

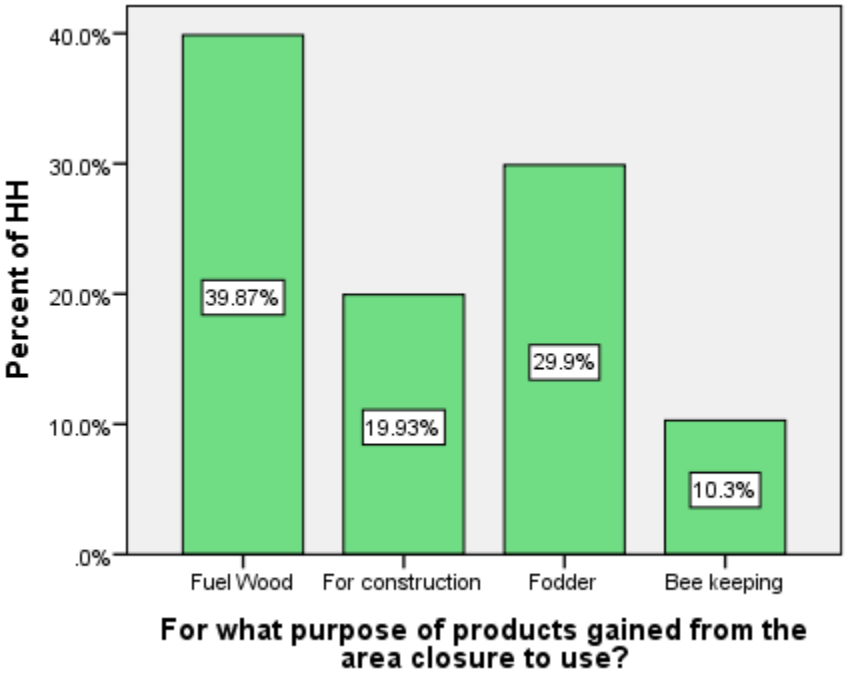


Figure 4.2 Purpose of area closure products to the local community

As depicted in Figure 4.2 above, the majority (39.87%) of the sampled households believes that the area closure contributed fuel wood, 29.9% of them believes that the area closure contributed fodder for livestock, 19.93% of them believes that the area closure contributed construction material and the rest 10.3% of them believes that the area closure contributed bee keeping. These households mostly are very near to the area closure and use the large quantity of products harvested for subsistence purpose. This was supported by studies that state closed sites provide grass and wood access for local community beyond their aim of establishment (Mengistu et al., 2005) and are also attractive in financial terms, as people could had to purchase grass from other areas (Girma et al.,2009). The other contributions of area closure for livelihood improvement in area closures have shown improvement with specific products like fodder harvesting and bee keeping. The only area closure product that communities were allowed to harvest was grass for livestock feed (once or twice in a year). Livestock are not allowed to enter the closure. But the majorities of the households are allowed fodder to cut-and-carry twice a year. Harvesting other products like dead branches and trees for domestic purpose is not allowed. Fodder is the major area closure product needed by the households for maintaining their livestock.

4.5 Major Challenge of Practicing Area Closure

Most of the sampled household heads identified that area closure didn‘t have any disadvantage. However, a few of them mentioned lack of enough community awareness on area closure, narrowing of farm plots and communal grazing lands, lack of strong stakeholders integrations to protect and manage the area closure, lack of active stakeholders participations to protect and manage the area closure, lack of materials to care and protect the area closure, restricting movement of livestock, limiting rearing of animals on a large scale basis, and leading to reduction in fodder for livestock as the demerits of area closure. This implies that there is little resistance to adopt and protect the existing area closure in the watershed under consideration. However, the issue of fuelwood shortage (Wolde et al., 2015) as a result of the presence of such closed area is not raised by the respondents. This may be because of the reason that farmers are collecting firewood from trees grown on their farmlands and homesteads. Degradation of non-closed communal grazing lands and a lot of energy requirement of cut-and-carry system (Descheemaeker et al., 2010; Wolde et al., 2015) are also other disadvantages, which were not listed by the respondents. Wolde et al. (2015) proposed that such stresses of the community shall

be addressed by GOs, NGOs, and the communities on a collaborative basis. In contrary to the above result, Wolde et al. (2007) found that no respondent involved in their study mentioned the negative impact of closing a degraded area. Community members were asked to specify key management problems under the current system. According to the participants, the current system is too weak to effectively prevent illegal harvesters, as result, there is no equal benefit sharing among the community members. Beside this, low incentive packages for guards, the nature of the resource system (for instance, scale of closures area are very large in size to monitor), weak rules, and ineffective monitoring are mentioned as major challenges that have been barrier to fully benefit from the area closures in the area.

In response to the FGD question regarding the major challenges the community encountered before the establishment of the area closures, they pinpointed that unwillingness of the community to cooperate /lack of cooperation ,unwillingness to rehabilitate land communally ,the land had been severely degraded ,the land was infertile, there was high erosion ,productivity decreased ,there was lack of awareness and totally absence of awareness prior to the implementation of the are closure.

Finally, some of the respondents who participated in FGD mentioned the return of wild animals such as hyena, monkey, apes have been created challenges particularly during the harvesting season (they eat the farmers crops, create insecurity (hyena). In addition to this, decreasing grazing lands for their livestock, in some cases shortage of charcoal and fuel wood were some of the challenge they encountered after the establishment of the area closure

. 

Fig 4.1 Established area closures at Boset Woreda

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study provided evidence about the socioeconomic impact of community based area closure on the livelihood of local community. The study revealed that the community had the negative perception on the community based area closure at the beginning of its establishment. However, this negative perception significantly changed after they started benefit from the area closure in their locality. Results of the present study clearly demonstrated that area closure contributed a lot to the local community in terms of bee keeping, increased productivity of their farm land, reduced soil erosion, rehabilitated the degraded lands, increased the aesthetic value of the soundings, increased the availability of food for livestock. The study further generated evidence that the potential role of area closures in enhancing the recovery of vegetation diversity on degraded lands. Most of the respondents also confirmed that they had obtained socio-economic benefits from the establishment of the area closures through control of soil erosion, better availability of grass for animal feed, increase in honey production and biological diversity of the area, increase in productivity of adjacent farmlands, increase the esthetic value of the land as well as create conducive environmental condition for the local communities in terms of conservation, recreation, eco-tourism and employment.

Economically, the area closures have increased agricultural productivity of the farmlands, particularly those located adjacently, through control of flooding from the hillsides to the farms. Consequently, farmers are less exposed to soil erosion and resulted problem of loss of productivity, from this respondents were benefited. Local communities are able to have better quality and quantity of grass from the closures as the areas are protected from free human and animal interference. In fact, harvesting grass from closures for animal feed is a highly appreciated benefit of the closures by the communities. Similarly, the closures and the regeneration of the natural vegetation have increased the esthetic value like as ecotourism site developed the land and create conducive environmental condition for the local communities.

In terms of ecological services, the area closures significantly reduced the flooding problem and helped for the better environmental protection and management of natural resources in the area

closures as well as in the nearby farmlands. Due to vegetation cover increment, large gullies around the area closures have stabilized and farmlands are now more productive than earlier times

5.2 Recommendations

Based on the major findings of the study the following recommendations are forwarded: To guarantee the sustainability of area closure, it is recommended to incorporate it with apiculture, livestock fattening, dairy production, planting of fruit trees and also trees used as fuel wood like *Acacia decurrens*, and introduction of alternative energy resources to the community.

i. There is also a need to raise awareness of a few farmers, who did have negative feeling about area closure through proper education by concerned bodies..
ii. In general, the closure was more worthy socio economically and it is serving the community. Therefore, the government, and other concerned body should aware and understand to the pessimistic people on its worthiness.
iii. This study strongly recommends the implementation of similar other area closure activities in alike environments in Ethiopia to boost both the environment and farmers' livelihood.

REFERENCE

Abebe, T., D. H. Feyssaand and E. Kissi (2014). Area Enclosure as a Strategy to Restore Soil Fertility Status in Degraded Land in Southern Ethiopia. Journal of Biological and Chemical Research 31 (1): 482-494

Abenet M., Grey S. and Joosten K. (2016). Climate Smart Initiative: Area Closure. FAO and The Ministry of Agriculture and Natural Resources, Ethiopia.

Abiyou Tilahun, Hailu Terefe and Teshome Soromessa(2015) The Contribution of EthiopianOrthodoxTewahido Church in Forest Management and Its Best Practices to be Scaledup in North Shewa Zone of Amhara Region, Ethiopia. Agriculture, Forestry andFisheries. Vol. 4, No. 3, 2015, pp. 123-137. doi: 10.11648/j.aff.20150403.18.

Adem, A. A., Mekuria, W., Belay, Y., Tilahun, S. A., and Steenhuis, T. S. (2020). Closures improve degraded landscapes in the sub-humid Ethiopian Highlands: The FerenjWuha watershed. Journal of Environmental Management, 270, 110802.

AkliluAmsalu and Jan de Graaff (2006). Farmers views of soil erosion problems and theirconservation knowledge at Beressa watershed, Central high lands of Ethiopia. Agriculture and Human, Vol. 23:99–108.

Alemayehu Dessalegn (2009). Effect of land management on vegetation dynamics of grazing lands of Mana-Sibu Woreda, West Wollega, Oromia, MSc. Thesis Presented to the School of Graduate Studies of Haramaya University, Haramaya University, pp 83

Allen, C. D., M. Savage, D. A. Falk, K. F. Suckling, T. W. Swetnam, T. Schulke, P. B. Stacey, et al. 2002. "Ecological Restoration of Southwestern Ponderosa Pine Ecosystems: A Broad Perspective." Ecological Applications 12:1418–33

Allen, E.B., 1995. Restoration ecology: limits and possibilities in arid and semiarid lands. In: Proceedings of the Wildland Shrub and Arid Land Restoration Symposium, Las Vegas, NV, October 19-21, 1993. General Technical Report INT-GTR- 315. US Department of Agriculture, Forest Service,Ogden,UT,pp. 7-15.

Ambachew W. (2006). Vegetation and soil property changes following degraded hillsides closure and its socioeconomic significance in east Shewa, Ethiopia. Masters thesis, Swedish University of Agricultural Sciences SLU.

Aradottir, L. A., Svavarsdottir, K., Jonsson, H. P. and Gudbergsson, G. (2000). Carbon accumulation in vegetation and soil by reclamation of degraded area.Buvisindi, ICEL. AGR. SCI. 13: 99-113.

Asmare T. and Gure, A. (2019). Effect of closure on woody species diversity and population structure in comparison with adjacent open grazing land: the case of JabiTehnan Woreda north western Ethiopia, Ecosystem Health and Sustainability, 5:1, 98-109, DOI: 10.1080/20964129.2019.1593794

Arega Bazezew (2013). Determinants of Rural Household Food Security in Drought Prone Areas of Ethiopia: Case study in Lay Gaint Woreda, Amhara Region. PhD Thesis. University of South Africa

Ayele, A.(2019). Impacts of landscape restoration on the environment and farmers' livelihood in Hita-Borkena watershed, northeastern Ethiopia.

Belete, L. (2017). Factors influencing adoption of SWC practices in the case of Damota watershed, Wolaita zone, Southern, Ethiopia. International Journal of Agricultural Science and Research, 7(1), 001-009 http://academeresearchjournals.org/journal/ ijasr.

BenDor, T., T. W. Lester, A. Livengood, A. Davis, and L. Yonavjak. 2015. Estimating the Size and Impact of the Ecological Restoration Economy. PLoS ONE 10:e0128339.

Bendz, M., 1986.Hill Side Closures in Welo.Ethiopian Red Cross Society Mission Report, Vaxjo, Sweden.

Betru N., Jawad A. and Ingrid N. (2005).Exploring ecological and socio-Economic issues forthe improvement of area enclosure management: A Case Study from Ethiopia.DCGReport No. 38

Beyene Fekadu (2009) Exploring incentives for rangeland enclosures among pastoral and agropastoral households in eastern Ethiopia. Global Environmental Change, 19(4), 494-502.

Blay, D., E. Bonkoungu and B. Chikamai. 2004. Rehabilitation of degraded lands in Sub-Saharan Africa: Lessons learned from selected case studies. Forestry Research Network for SSA.International Union of Forest Research Organizations (IUFRO).

Blignaut, J., K. J. Esler, M. P. de Wit, D. Le Maitre, S. J. Milton, and J. Aronson(2013). Establishing the links between economic development and the restoration of natural capital. Current Opinion in Environmental Sustainability 5:94-101.

Blignaut, J., J. Aronson, and M. de Wit (2014). The economics of restoration: looking back and leaping forward. Annals of the New York Academy of Sciences 1322:35-47.

Boset Woreda Agriculture and Natural Resource Management Office (2021). Boset woreda the 2021 annual report

Central Statistical Authority (CSA, 2013): Agricultural sample survey (2012/2013), Report on livestock and livestock characteristics (Privet and Peasant Holdings), Federal Democratic Republic of Ethiopia, Addis Ababa, 9-20.

Charles, A., Loucks, L., Berkes, F., and Armitage, D. (2020). Community science: A typology and its implications for governance of social-ecological systems. Environmental Science and Policy, 106, 77–86

CSA and WB(2013). Ethiopia Rural Socioeconomic Survey (ERSS): Survey Report, Central Statistical Agency (CSA) and the World Bank (WB). Addis Ababa, Ethiopia.

de Groot, R. S., J. Blignaut, S. Van Der Ploeg, J. Aronson, T. Elmqvist, and J. Farley. 2013. Benefits of Investing in Ecosystem Restoration. Conservation Biology 27:1286- 1293

Damtew, A. A., Husen, M. A., & Demeku, M. A. (2015). Determinants of adopting practice of SWC in Goromti watershed, western Ethiopia. Journal of Soil Science and Environmental Management, 6(6), 168e177. https://doi.org/10.5897/JSSEM150492.

Dejene A, Shishira E, Yanda P, Johnsen FH (1997). Land Degradation in Tanzania: Perception from the Village. Washington, DC: World Bank, Technical Paper No. 370.

Descheemaeker K., Nyssen J. Rossi J., Poesen J., Mitiku H., Raes D., Muys B., MoeyersonsJ., Deckers S.(2005). Sediment deposition and pedogenesis in closures in the Tigrayhighlands, Ethiopia. Elsevier B.V.

Descheemaeker, K., Mapedza, E., TilahunAmede, and WagnewAyalneh(2010). Effects of integrated watershed management on livestock water productivity in water scarce areas in Ethiopia. Physics and Chemistry of the Earth, 35, 723–729, Doi:10.1016/j.pce.2010.06.006

EDHS (2016). Ethiopian Demographic and health survey (EDHS), Addis Ababa, Ethiopia and Carverton, Mary land, USA.

EndaleBedada, FetoEsimo, AlemayehuMuluneh. Effects of Area Closure on Selected Soil Physico-Chemical Properties in HidabuAbote Woreda, North Shewa Zone, Oromia.Journal of Energy, Environmental and Chemical Engineering. Vol. 5, No. 1, 2020, pp. 1-9. doi: 10.11648/j.jeece.20200501.11

ELD Initiative (2015). The value of land: Prosperous lands and positive rewards through sustainable land management. GIZ, Bonn, Germany.

Emiru, B. (2002). Actual and potential contributions ofenclosures to enhance biodiversity in dry lands of Eastern Tigray, with particular emphasis on woody plants.SLU (Swedish University of Agricultural Sciences),Sweden.

Emiru, B., Demel, T. and Barklund, P. (2006). Actual and potential contribution of closures to enhance biodiversity of woody species in the drylands of Eastern Tigray. Journal of the Drylands, 1(2): 134-147.

Endale Bedada, Feto Esimo and Alemayehu Muluneh (2020). Effects of Area Closure on Selected Soil Physico-Chemical Properties in Hidabu Abote Woreda, North Shewa Zone, Oromia.Journal of Energy, Environmental and Chemical Engineering. Vol. 5, No. 1, 2020, pp. 1-9. doi: 10.11648/j.jeece.20200501.11

Falk, D. A. (1990). “Discovering the Past, Creating the Future.” Restoration and Management Notes 8:71–72.

FAO (2001). Food and Agriculture Organization. News and highlights: Forestry forum spotlights poverty alleviation.Rome, Italy.

GACGCS (German Advisory Council on Global Change Secretariat) (2005) Development needs environmental protection: Recommendations for the Millennium +5 Summit, Policy Paper No. 4, Berlin, Germany.

Gashaw, T., Bantider, A., and G/Silassie, H. (2018). Land Degradation in Ethiopia: Causes, Impacts and Rehabilitation Techniques. Journal of Environment and Earth Science, Vol.4, No.9, 201.

Gebrehaweria Gebregziabher, Dereje Assefa, Girmay Gebresamuel, Giordano, M., and Langan, S.(2016). An Assessment of Integrated Watershed Management in Ethiopia. Colombo, Sri Lanka: International Water Management Institute (IWMI). 28p. (IWMI Working Paper 170), DOI: 10.5337/2016.214

Gebregziabher, D., Soltani, A., and Hofstad, O. (2017).Equity in the distribution of values of outputs from closures in Tigray, Ethiopia. Journal of Arid Environments, 146, 75–85.

Gidey et al (2021). Impact of community based closure to smallholder farmers’ livelihood and their willingness to pay: empirical evidences from Tigrai, Ethiopia Environment, Springer Development and Sustainabilityhttps://doi.org/10.1007/s10668-021-01547-1

Haigh, Martin (2003). Land Rehabilitation, Land Use, Land Cover And Soil Sciences,Vol.(IV)

Heitschmidt, R.K., Vermeire, L.T. & Grings, E. (2004). Is rangeland agriculture sustainable? American Society of Animal Science, 82:138-146.

Hengsdijk, H. and Jansen, H. (2006). Agricultural development in the Central Ethiopian Rift valley: A desk-study on water-related issues and knowledge to support a policy dialogue. Plant Research International B.V., Wageningen, Netherland.

Hobbs RJ and Harris JA. (2001) Restoration ecology: repairing the earth's ecosystems in the new millennium. Restoration Ecology 9: 239–246.

KamaraC.S.,l. Haque and A.R.Soka (1992) Soil Physics manual. Working Document No. B12, International Livestock Center for Africa (ILCA), Addis Ababa, Ethiopia, PP: 1-106.

Kibret, M. (2008). Enclosure as a viable option for rehabilitation of degraded lands and biodiversity conservation: The caseof Kallu Woreda, Southern Wello Ethiopia. Masters thesis, Addis Ababa University Faculty of Science, Environmental Science Program, Addis Ababa, Ethiopia.

Kindeya Gebrehiwot (1997) Area enclosures as an approach in the management of dry land biodiversity: a case study in Tigray region, northern Ethiopia. Proceedings of the Workshop on management of Dry land Biodiversity. 30 July – 1 August, 1997, Nairobi, Kenya.

Kindeya Gebrehiwot (2004) Dry land agro-forestry strategy for Ethiopia. Mekelle, Tigray, Ethiopia, pp.1-20.

Le, Q., B., Nkonya, E. M., and Mirzabaev, A. (2016).Biomass productivity-based mapping of global land degradation hotspots. In Economics of land degradation and improvement- A global assessment for sustainable development,. http://dx.doi.org/10.1007/978-3-319-19168-3_4

MacDonald, W. D., Moorhouse, P. T. and Enck, W.J., (2002), The ecological context: a species population perspective. In: Perrow, M.R. and Davy A. J. (eds), Handbook of Ecological Restoration, Vol. 1, Principles of Restoration. Cambridge University Press, Cambridge. Pp.155 –183.

McIver, James; Starr, Lynn. 2001. Restoration of degraded lands in the interior Columbia River basin: passive vs. active approaches. Forest Ecology and Management. 153: 15-28

Mahesh war DHAKAL and Misa MASUDA (2008) Role of participatory forest management inrural livelihood improvement: a case of Nawalparasi Woreda, Nepal Graduate School of Life and Environmental Sciences, University of Tsukuba, Japan.

Manaye, A., Negash, M., and Alebachew, M. (2019). Effect of degraded land rehabilitation on carbon stocks and biodiversity in semi-arid region of Northern Ethiopia. Forest Science and Technology, 15:2, 70-79, DOI:10.1080/21580103.2019.1592787

Mastewal, Y., Kindeya, G., Stein, M., and Wilde, M. (2006). Impact of area enclosures on density, diversity, and population structure of woody species: the case of May Ba'ati-DougaTembien, Tigrai Ethiopia. Ethiopian Journal of Natural Resources, 8(1), 100–110.

Medhin Zewdu (2002).Sustainable Development In Ethiopia 6 (*2002*), Available At www.*Worldsummit2002*.Org/Texts/Ethopiare

Megerssa, R. G., and Bekere, B. Y. (2019). Causes, consequences and coping strategies of land degradation: evidence from Ethiopia. Journal of Degraded and Mining Lands Management, Vol 7, No 1, 1953-1957.

Miheretu, B., Yimer, A.(2017). Determinants of farmers' adoption of land management practices in Gelana sub-watershed of Northern highlands of Ethiopia. Ecol Process 6, 19 (2017). https://doi.org/10.1186/s13717-017-0085-5

Mekuria W, Langan S, Noble A, Johnston R. (2017).Soil restoration after seven years of closure management in Northwestern Ethiopia. Land Degrad Develop. 28(4):1287–1297.

MekuriaWolde, 2011."Closure land management for restoration of the soils in degraded communal grazing lands in northern highlands of Ethiopia," Land Degradation and Development.

MekuriaWolde, 2013. "Conversion of communal grazing lands into closures restored soil properties in the semi-arid lowlands of Northern Ethiopia," Arid Land Research and Management, vol., 27, pp. 153–166.

Mekuria, W. (2013). Changes in regulating ecosystem services following establishing closures on communal grazing lands in Ethiopia: A synthesis. Journal of Ecosystems, 2013.

Mekuria, W., Gebregziabher, G., and Lefore, N. (2020). Closures for landscape restoration in Ethiopia: business model scenarios and suitability (Vol. 175). IWMI.

Mengistu Asmamaw and Mekuria Argaw, 2015. Assessing Farmers‘ Perception of Enclosures, Kewot Woreda, Northeastern Ethiopia. International Journal of Environmental Protection and Policy, 3(6), 181-187, DOI: 10.11648/ j.ijepp.20150306.11

Miller, K., Allegretti .M.H., Johnson, N. and Jonsson, B., (1995), Measures for conservation of biodiversity and sustainable use of its components. In: Heywwod, V. H. and Watson, R.T.(eds).

Mengistu, T., Teketay, D., Hulten, H., and Yemshaw, Y. (2005).The role of enclosures in the recovery ofwoody vegetation in degraded dryland hillsides of central and northern Ethiopia. Journal of Arid Environments, 60, 265–280.

Meron Tekalign (2010)The Role of Area Closures for Biodiversity Conservation and its Contribution to Local Livelihoods The case of Biyo-Kelala Area Closures in Ada`awereda, Master thesis for Addis Ababa University.

Mganga KZ, Musimba NKR, Nyariki DM. (2015). Combining sustainable land management technologies to combat land degradation and improve rural livelihoods in semi-arid lands in Kenya. Environ Manag.56(6):1538–1548.

Mitiku Haile, Kindeya Gebrehiwot, 2001. Local initiatives for planning sustainable natural resources management in Tigray, northern Ethiopia. Ethiopian journal of natural resources, 3:303-326.

Mohammed Kasim, Zebene Assfaw, Abayneh Derero, Mateos Melkato and Yosef Mamo, 2015). The Role Of Area Closure On The Recovery Of Woody Species Composition On Degraded Lands And Its Socio-Economic Importance In Central Rift Valley Area, Ethiopia, International Journal of Development Research Vol. 5, Issue, 02, pp. 3348-3358, ISSN: 2230-9926

Mureithi, S. M., Verdoodt, A., Gachene, C. K., Njoka, J. T., Wasonga, V. O., De Neve, S. Van Ranst, E. (2014).Impact of enclosure management on soil properties and microbial biomass in a restored semi-arid rangeland, Kenya. Journal of Arid Land, 6(5), 561–570.

Nedessa, B. B., Ali, J., and Nyborg, I. (2005). Exploring ecological and Socio-economic issues for the improvement of area enclosure management DCG Report No . 38, (38)

Nkonya E., Johnson T., Kwon H.Y., Kato E. (2016) Economics of Land Degradation in Sub-Saharan Africa. Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development. Springer, Cham

NMSA, (2015): National Meterological service Agency, Addis Ababa, Ethiopia. Obadiah, H.I. and Shekaro, A. (2012): Survey of tick infestation of cattle in Zaria Abattoir, Nigeria. J. Vet. Advances, 2(2): 81-7.

Palik BJ, Goelbel PC, Kirkman LK, and West L. (2000) Using landscape hierarchies to guiderestoration of disturbed ecosystems. Ecological Applications 10: 189–202.

Reside AE, VanDerWal J, Moran C. (2017). Trade-offs in carbon storage and biodiversity conservation under climate change reveal risk to endemic species. BiolConserv. 207:9–16.

SER (2004).The SER International Primer on Ecological Restoration. Tucson. Accessed April 27, 2015. www.ser.org.

Shimizu T. (2006) Assessing the access to forest resources for improving livelihoods in West and Central Asia countries. FAO LSP WP 33.Access to Natural Resources SubProgramme.

Soares JLN, Espindola CR, Pereira WLM (2005) Physicalproperties of soils under soil acidity effects on nutrient use efficiency in exotic maize genotypes. J Plant Soil Sci 192: 9–13.

Taddese, G. (2001). Land degradation: a challenge to Ethiopia. *Environ Manage*. 2001;27(6):815-824. doi:10.1007/s002670010190

Tefera Mengstu (2001) the role of enclosures in the recovery of woody vegetation in degraded dryland hillsides of central and northern Ethiopia, Sweden MSc Thesis, SLU with WGCFin Ethiopia.

Tefera, M., T. Demel, H. Hulten and Y. Yemshaw (2005).The role of communities in closed area management in Ethiopia.Mount. Res. Dev., 25: 44-50.

Tegegne Sishaw (2014). Population Dynamics and its Impact on Land Use / Cover in Ethiopia: the Case of Mandura Woreda of Metekel Zone, Benshangul-Gumuz Regional State. PhD Thesis. University of South Africa.

Teketay, D., Kashe, K., Madome, J. et al. (2018). Enhancement of diversity, stand structure and regeneration of woody species through area closure: the case of a mopane woodland in northern Botswana. https://doi.org/10.1186/s13717-018-011x

Toy TI, Foster GR, and Renard KG (2002) Soil erosion: processes, prediction, measurement, and control. Wiley, New York p338.

Tucker, N. I., and Murphy, T. M. (1997). The efects of ecological rehabilitations on vegetation recruitment: some observations from the wet Tropics of North Queensland. Forest Ecology and Management, 99, 133–144

United Nations Convention to Combat Desertification (UNCCD)(2022). Global Land Outlook 2nd edition. Available at :https://www.unccd.int/sites/default/files/2022-04/UNCCD_GLO2_low-res_2.pdf

Visser S, Leenders JK, Leeuwis M (2002).‘‘Farmers’ perceptions of erosion by wind and water erosion in Northern Burkina Faso.’’ Land Deg. Dev. 14: 123–132

Warner k., McCall E., and Garner S. (2008)The Role of NTFPs in Poverty Alleviation and Biodiversity Conservation Proceedings of the international workshop on the theme in HaNoi, June 2007 February, 2008 Ha Noi, Viet Nam.

Wild A. (1993) Soils and the environment: An introduction. Cambridge University, pp. 40-85.

Wolde Mekuria, Veldkamp, E., Mitiku Haile, Nyssen, J., Muys, B., and Kindeya Gebrehiwot (2007). Effectiveness of Exclosures to Restore Degraded Soils as a Result of Overgrazing in Tigray, Ethiopia. Journal of Arid Environments, 69, 270–284, DOI:10.1016/j.jaridenv.2006.10.009

Wolde Mekuria, Veldkamp, E., Mitiku Haile, Kindeya G/Hiwot, Muys, B. & Nyssen, J. (2009). Effectiveness of exclosures to control soil erosion and Local community perception on soil erosion in Tigray, Ethiopia.

Wolde Mekuria, Veldkamp E., Corre MD., and Mitiku Haile (2011) Restoration of ecosystem carbon stocks following closure establishment in communal grazing lands in Tigray, Ethiopia. Soil SciSoc Am J 75:246–256.

Wolde Mekuria, Barron, J., Mengistu Dessalegn, Zenebe Adimassu, Tadele Amare and Menale Wondie, (2017).Exclosures for Ecosystem Restoration and Economic Benefits in Ethiopia: A Catalogue of Management Options. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 28p. (WLE Research for Development (R4D) Learning Series 4), DOI: 10.5337/2017.204

Yayneshet, T., Eik, L. O., and Moe, S. R. (2009). The effects of closures in restoring degraded semi-arid vegetation in communal grazing lands in northern Ethiopia. Journal of Arid Environments, 73(4–5), 542–549.

Yirdaw E, Tigabu M, MongeMonge AA. (2017). Rehabilitation of degraded dryland ecosystems – review.Silva Fenn. 51(1):1–32.

ANNEX

Appendix 1: Questioners

Dear Respondent,

This questionnaire was designed to collect information from households reside in Boset Woreda, Oromia Region and aimed to analyze **"Socio-Economic Impacts Of Community Based Area Closure: The Case of Boset Woreda, Oromia Region"** as a research subject for the partial fulfillment of the requirements of Master of Art in Environment and Sustainable *Development* Studies.

Your response would have been used only for academic purpose and kept confidential.

Thank you in advance for your co-operation.

Tewodros Berhanu

Environment and Sustainable Development Student

Email:teddyinheaven@gmail.com

Tell+251913174834

Addis Ababa University

Addis Ababa, Ethiopia

General Directions:

i. You are kindly requested to give genuine responses.
ii. You don ‘t need to write your identification
iii. Please put a tick (√) in the appropriate box.
iv. Put the numbers you agree with to those questions which are not multiple choices.

Part I. Household interview survey questionnaires

- Questioner number:_____
- Interviewee code:_____
- Interviewed by:_____
- Data entered: _____
- Entered by:_____
- Kebele/PA: Code:_____
- Village (Gotte) name_____

A. Personal Characteristics of the Household Head

1. Sex of Household Head

   Female ☐ Male ☐

2. Age of Household Head

   15-24 ☐ 25-34☐ 35 -44☐ 45 -54 ☐ 55-64☐> 64☐

3. Marital Status household head

   Single ☐Married ☐ Divorced/Widowed ☐

4. Literacy Level

Illiterate ☐ Primary ☐ Secondary ☐ Higher Education and above ☐

Part -Two: Question Related to Household

B. Household Characteristics

5. Household Size _____
6. Households’ income livelihood strategies

   Rain-feed ☐ Irrigation ☐ Both Rain-fed and Irrigation ☐ Livestock ☐ Off-farm seasonal work ☐Others☐

7. Number of Livestock owed by the household_____
8. Land Holding size(Ha)_____
9. Land-use Type composition
10. Rain-feed ☐ Irrigation ☐ Both Rain-fed and Irrigation ☐ Grazing land ☐ Closure area ☐

Part -Three: Perception of the local community about Area closures

11. When wasarea closure started in your area?_____
12. Why do you think the area closure started in your area? _____
13. Who established area closure in your locality?
    1. Government ☐ 2. Community ☐ 3. NGO ☐
14. Who own the enclosed areas?
    1. Government ☐
    2. Associations related with area closures☐
    3. Community ☐
    4. NGO ☐
15. Who is primarily responsible for the area closure protection?
    1. Government ☐ 2. Community ☐ 3. NGO ☐
16. What are the major causes of deforestation around your localities? 1) Agricultural expansion 2) Cutting tree for construction 3) Cutting tree for fuel wood 4) Cutting tree for farm implementation 5) Uncontrolled burning 6) Due to lack of awareness 7) other
17. Why was area closure established in your area?
    1. To restrict the local community from accessing land ☐
    2. To rehabilitate degraded area ☐
    3. Others (Specify _____
18. What do you think about the closure of such an area?
    1. It good with farm land
    3.It prevents from accessing firewood
    2. It good for grazing land
    4. Other (Specify)_____

19. Is there wild life in your area? List them _____

20. Have you seen new wild animals after area closure establishment?
    List them _____

21. What was your feeling during establishment? 1) Positive 2) negative 3) neither

22. Is there attitude change after establishment of Area closure? 1) Yes 2) no if yes/no, specify_____

23. Since when do you know about the practices of area enclosures?1) since two years 2) since three years 3) since five years 4) Have no information about area closure

24. On what basis is the site to be closed selected?
    1) The more accessible the first to be closed
    2) The more degraded the first to be closed
    3) The more area covers the first to be closed
    4) Others Specify _____

25. Has the demarcation assisted to set local laws and regulations?1) Yes 2) No

26. If your answer is yes for Q. 13. Who was responsible to set laws and regulations?
    1) The local community by themselves 2) The agricultural office 3) Local administration 4) NGOs 5) Social cooperative 6) All

25. Are you willing to protect further additional area closure in the future?
    1) Yes_____ 2) No_____ If yes, why_____ if no, and why____

26. What are the key management problems of Area closure? List_____

Part 4 :Involvement of Local people in Area closure

27. Is there any associations related with area closure in your locality?
    Yes ☐ No☐

28. What role do you have in the Association?
    1. Office bearer ☐ 3.Member ☐
    2. Committee Member ☐ 4.other (specify) ☐

29. Do the associations have legal body?
    Yes ☐No☐

30. If "No" how the association manage or govern issues related with the protected area?
Pleaseindicate_____

31. Are there any rules to manage illegal users of the closed area?
Yes ☐No☐

32. Does the bylaw punish illegal users?
Yes ☐ No ☐

Part 5: Questions Related to Socio economic contributions of community based area closures

33. Is your Agricultural land Adjacent to the closed area? 1. Yes_____ 2.No_____

34. If yes when did you start to use the land adjacent to area closure?
1. before 1 years_____ 2. 2 years____3. 5 years_____4.10 years_____

35. What was the status of your agricultural land before the establishment of area closure?
1. Very bad 2.bad 3.Moderate 4. Good 5. Others (specify) _____

36. What did you observe about crop yields on your farmland after area closure?
1. Increased 2.decreased3.No change

37. If increased what do you think is the reason?
1. Since the adjacent area closed, erosion is minimized
2. because of using other inputs like fertilizers
3. Since the adjacent area closed, Gullies rehabilitated
4. Other (specify

38. How do you compare your Agricultural land productivity with agricultural land adjacent to the closed area? 1. Bad 2. Moderate3.better 4.other (Specify?)

39. For what purpose of products gained from the area closure to use?
1) Fuel wood 2) for construction 3) fodder5) Bee keeping 6) Other specify_____

40. What are the benefits from the closed area products (You can select more than one item)
1) Human Foods 2) Feed for Livestock 3) Construction Materials 4) Honey 5) Firewood andCharcoal 6) habitat for wild animals 7) aesthetic value 8) Other(Specify)

41. Do you use fuel wood from enclosed area?
Yes ☐ No ☐

42. Are you keeping bee?
Yes ☐ No ☐

43. If Yes, how do you evaluate your honey production after area closure

Increasing ☐Decreasing ☐No change ☐donot known ☐

44. Do you have crop farm?

Yes ☐ No ☐

45. If Yes, how do you evaluate your crop production after area closure

Increasing ☐ Decreasing ☐No change ☐ do not known ☐

46. What is the condition of the fertility of your farm land now?

Very fertile ☐

Fertile☐

Moderate☐

Declining ☐

Others ☐(specify) _____

47. Are you willing to protect further additional area closure in the future?

Yes☐ No☐

48. If yes in 31, why_____

49. IF no, in question 31 why_____

50. What are the social impact of area closure_____

51. List the major challenges for practicing area closure_____

Part 6: Questions Related to Environmental contributions of community based area closures

52. What changes have you observed in the area closure vegetation cover since the establishment of the area closure(you can select more than one)?

1) Natural vegetation has disappeared 3) plantation has increase 2) Natural vegetation has increased 4) Natural vegetation has decreased 5) Plantation has decreased 6) wild animals are creating problems 7) disappeared wild animals are returned

53. Has the change positively affected your land, adjacent land and the uplands in general?

1. Yes ----------, 2.No ----------

54. If yes, can you mention some of the changes?

1. Stream flow increased 2.Run-off decreased 3.More gullies and rills rehabilitated

4. Yield has increased 5.others (specify)_____

55. What environmental benefits have you gained as a result of the establishment of the area closure in your vicinities_____?

56. Is there a conflict in the use of natural resources which are found in the area closure?

1. Yes ----------, 2.No ----------

57. If yes, what are the main sources of conflict?

_____

Appendix 2. Checklist for focus group discussions

1. When the area closure established in your kebele and by whom?

_____

2. What are the major challenges you encountered before the establishment of the area closures?-

_____

3. What was community participation and the processes followed to established area closures?

_____

4.What are the benefits of area closures to communities_____

5. What problems has area closures brought to the local communities

_____

6. Who is responsible for the management of closures? _____

7. Please discuss the management of area closures? The participation of men, women, youth and why they do _____

8. How do you evaluate the current area closure management practices? _____

9. Are there community rules and regulations? If so, how these rules and regulations are effective_____

10. Who are the most active participant in the management of area closures among the communities and why for_____

A. Men B. Women C. Female youth D. Male youth E. All

11. Are you happy with the communal area closure? If yes/ no, why_____

1) Yes….. 2) No… Why? ----

13. What do you think the strengths and weaknesses of area closure?

Strengths_____ Weakness_____

14. Any comment you suggest in establishing and management of area closure_____

15. What are the major source of conflicts in the area closures? Who most violates the rules and regulations and why_____

16. What kind of support do you need to sustain the area closure in your locality?_____

17. What kind of support do you need from Government/community/NGOs/other? Government_____

Community_____

NGOs_____

18. How many hectare of land are rehabilitated and enclosed in your kebele?_____

19. What kind of IGAs are established as a result of the establishment of area closure in your localities?_____

Thank you