



COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF NATURAL RESOURCE

Assessment of the impacts of land degradation and rehabilitation strategies of the community in Meinit Goldiya woreda.

SUBMITTED TO NATURAL RESOURCE MANAGEMENT FOR PARTIAL FULFULMENT OF THE BACHELOR OF SCIENCE (BSc)

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May, 2022

Wolkite, Ethiopia

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ABBREVIATION

DAs – Development agents

Mm - millimeter

M.a.s.l – mean above sea level

°C - degree centigrade

MARD – Ministry of Agriculture and rural development

GDP – Global Development Program

FAO – Food and Agriculture Organization

Acknowledgment

The researchers would like to thank Wolkite University for giving chance for study leave and all kebele administrations for cooperation in data collection. And also all staff members of Natural resource experts in Meinet Goldia woreda agriculture and natural resource department for their invaluable support in data collection of the research work. Lastly our profound gratitude goes to our adviser, for his in rightful suggestions, guidance, and understanding from the initial stages of writing the proposal up to the time of production of this dissertation.

Abstract

Land degradation is a major global issue for the 20th century and will remain high on the international agenda even for the 21st century. Land degradation includes all process that diminishes the capacity of land resources to perform essential functions and services in ecosystems are caused by two interlocking complex systems: the natural ecosystem and the human social system. The general objective this study is to assess the impacts of land resource degradation and rehabilitation strategies of the community in MeinitGoldiyaworeda. The study was conducted in Meinit Goldiya woreda, South West Ethiopia people regional state, Ethiopia. The Annual rainfall in the area ranges from 1700-2000 mm, bimodal with the main rainy season from June to August and the short rainy season from late March to May, with mean annual temperature of 18°C. A total of 97 households were randomly selected and interviewed in four kebeles. The majority of the sample respondents (72%) were male, while the remaining (28%) were female. The household size of respondents ranges from 3 to 12 with the average of 7 members. the size of the farmlands of the sample respondents, results from household inventory shows that about 54.2% of the household heads have farm lands greater than 3ha hectares and the remaining 37.4%, 3.8%, 3.4% and 1.2% household heads have farm land size ranging between 2-3, 1-2 , 0.5-1ha and less than 0.5 hectares respectively. The livelihood of the people in the study area depended on livestock production, crop collection and off/non-farm activities. Findings from group discussion shows that the annual crops are mainly planted after the rains begin, allowing early rains to directly impact the soil contributing to high erosion levels. The survey result shows that About 186 (94.9%) of the sample household heads respond that there is a land degradation problem on their farmland

and the remaining 5.1%. household heads replied there is no land degradation on their farmland. Regarding the indicators of land degradation, respondents were asked to show the indicators of land degradation, results of household inventory showed that about 75.2% of respondents replied that reduction of land productivity from year to year is the main indicator for land degradation in the study area and the remaining 21.4%, 2.3% 1.1% reduction of livestock productivity, reduction of water availability and occurrence of dynamic climate change respectively. based on information from the survey result, out of the total sample studied households approximately 48.7% of the respondents replied that deforestation was main causes and the remaining 38.6%, 11.1% and 1.6% relied population growth, improper farming practice and overgrazing respectively.

1. Background/Introduction

Land degradation is a major global issue for the 20th century and will remain high on the international agenda even for the 21st century (Working Group on Land Degradation and Desertification of the International Union of Soil Sciences 1999). Various sources suggest that 5 to 10 million hectares worldwide are being lost annually to severe degradation. If this trend continues, 1.4 to 2.8 percent of total agricultural, pasture, and forestland will have been lost by 2020 (Scherr and Yadav 1996). Land degradation includes all process that diminishes the capacity of land resources to perform essential functions and services in ecosystems (Hurniet *al.* 2010) are caused by two interlocking complex systems: the natural ecosystem and the human social system. Interactions between the two systems determine the success or failure of resource management (Berry 2003). Principal processes of land degradation include erosion by water and wind, chemical degradation (comprising acidification, salinization, fertility depletion, and decrease in cation retention capacity), physical degradation (comprising crusting, compaction, hard-setting, etc.) and biological degradation (reduction in total and biomass carbon, and decline in land biodiversity) (WMO 2005). It is a continuous process and has become, however, an important concern affecting food security and the wealth of nations, and has an impact on the livelihood of almost every person on this earth (Bezuayehuet *al.* 2002).

Ethiopia is one of the most well-endowed countries in Sub-Saharan Africa in terms of natural resources (Geteet *al.* 2006). However, natural resource degradation in Ethiopia has been going on for centuries (Hurniet *al.* 2010). Similarly, Berry (2003) also stated that loss of land resource productivity is an important problem in Ethiopia and that with continued population growth the problem is likely to be even more important in the future. The major causes of land degradation in Ethiopia are rapid population increase, severe soil loss, deforestation, low vegetative cover and unbalanced crop and livestock production (Girma 2001). Topography, soil types and agroecological parameters are also additional factors playing significant role in the degradation processes influenced by man (Paulos 2001). To combat land degradation, the Ethiopian government launched a massive soil conservation programme in the middle of 1970's (Hawando 1997). A slogan of environmental movement in 1980s and 1990s i.e. "think globally- act locally" face

failures. Thus, a new slogan namely “think locally- actglobally” have to be created (Hurni 2002). In addition, afforestation and conservation programs have been made in the last three decades (Badege 2001). However, success to date has been limited (Badege 2001; Paulos 2001).

Thus, the purpose of this paper is to give an overview on the causes and impacts of land degradation in MeinitShasha, and to present rehabilitative measures to restore degraded lands. Sustainable management of the natural resource base is a fundamental issue to support global environmental benefits provided by ecosystem services, and to ensure agricultural production and ultimately food security and livelihoods. Assessing Land degradation is a major component of effective sustainable land management particularly in Small Developing States (FAO,2017).

1.2 Problem of statement

According to the Food and Agriculture Organization (FAO), land degradation is one of the root causes of declining agricultural productivity globally; if left uncontrolled, it will exacerbate the problems of food security within the region (Beckles, 2010). Additionally, it hampers the capacity of SIDS to adapt to climate change, which is one of most poignant developmental challenges facing SIDS. Degraded land is costly to reclaim. If severely degraded, it may no longer provide a range of ecosystem functions and services, and many other potential environmental, social, economic, and nonmaterial benefits that are critical for society and development (LADA Secretariat, 2000). Land is being the critical agricultural resource and the basis for survival of most people in Ethiopia. The largest proportion of the employment for labor is contributed from the agriculture sector. In spite of this, land is seriously threatened by land degradation throughout the country, threatening both the economic and survival of the people. It is a severe problem that food security problems (Kahsay B., 2004) and one of the major environmental threats that have well been acknowledged as a serious problem in Ethiopia. Land degradation in Ethiopia is a result of complex and interacting processes including adverse changes in soils, water, vegetation, biodiversity, and local climatic resources (Watson,2002).

According to (Genene, T. 2006); (Abiy,2008) the Hararghae highlands in Eastern Ethiopia, Tigrai, Wollo, and Semen Shoa highlands in the north and the Gamo-Gofa highlands and the Bilate River

basin, which starts in eastern slopes of Garage highlands and stretches through eastern Hadiya and Kembatta highlands are some of the seriously eroded/degraded land surfaces in Ethiopia. As in (Ahmed,2007) in Ethiopia land degradation, declining agricultural productivity, and poverty are severe and interrelated problems that appear to feed off each other. In light of the increasing population and the low levels of urbanization, all projections indicate that land degradation in Ethiopia is bound to proceed at aggravated rates unless significant progress is made in conservation, rehabilitation, and restoration. The activities in the different agricultural productivity have focused on the production of food crops rather on rehabilitation of degraded forest. This activity could significantly affect the community mainly the poor and women and the land.

1.3OBJECTIVE OF THE STUDY

The general objective this study is to assess the impacts of land resource degradation and rehabilitation strategies of the community in MeinitGoldiyaworeda.

1.3.1 Specific objective

To assess the rehabilitation mechanism of degraded farm land at households'level

To identify method of rehabilitation mechanism of degraded area

1.4Research question

1. What are major impacts of land degradation
2. What are rehabilitation mechanisms of degraded farm land?

1.5Significance of the study

The study evaluates the rehabilitation mechanism of degraded farm land towards improvement of agricultural productivity and rural livelihood that provide essential information for the scholars, decision makers, local administrators and other stakeholders. The results obtained in this study could be extrapolated to other degraded area in the country facing similar degradation problems. The study also aimed at recommending ways to promote degraded land involvement to enhance natural resource conservation. Thus, this study contributes to the current literature on the role of

rehabilitation mechanisms in the study area and also used as a base line information for further studies.

1.8 Scope of the study

The present study attempts to attain its underlined objectives and limited its scope in area and contents. The study was limited to Meinit Goldiya woreda, Bench MeinitGoldiyaZone. And the content of the study was focused on three sample Kebeles namely Bayneka, Goteka and Shasheka.

1. Literature review

2.1 Land degradation in tropical mountain areas and scope for rehabilitation

Land Degradation is considered to be “...any form of deterioration of the natural potential of land that affects ecosystems integrity, either in terms of reducing its sustainable ecological sustainability or in terms of reducing its biological richness and maintenance of its resilience” (GEF, 2003). Globally it affects over 100 countries on all continents with Antarctica being the only exception (Springer, 2006). SIDS is generally characterized by high levels of chronic poverty, largely rural based populations and heavy dependence on traditional agriculture and with specific reference to the Caribbean region, tourism based economies. In each instance land degradation has devastating effects on these countries such as significant structural constraints for economic growth, human development and environmental sustainability.

Due to their important altitudinal gradients, mountain regions receive much attention (Becker and Bugmann, 2001). Mountain agriculture systems are vulnerable to environmental change for various reasons, such as the cost of accessibility and infrastructure as well as the limited opportunity for production gains associated with scale of operation (Becker and Bugmann, 2001). Besides, in most tropical mountains, there are high population densities. In East Africa and Central America, there are far more than 100 inhabitants km₂ in all areas with an elevation over 2500 m a.s.l. Short-term increase in agricultural production is often obtained through increased pressure on the land, i.e. reduced fallowing, removal of vegetation between cropland, conversion of forest and woodlands on steep slopes into rangeland and marginal arable land. According to the ‘Global Assessment of Soil Degradation’ map (Oldeman et al., 1991), more than 50% of the northern Ethiopian highlands, for instance, suffer from extreme loss of topsoil due to sheet and rill erosion. Water erosion is a generalized problem in nearly all tropical mountains. In many tropical mountains, not the least in northern Ethiopia, huge efforts are undertaken to rehabilitate the land. However, the overall productivity of such areas is often perceived to be so dramatically damaged by human impact that recovery is deemed impossible (Rasmussen et al., 2001; Reij and Steeds, 2003). However, several impact studies have demonstrated that investments in tropical mountains

do pay off in economic terms (Holden et al., 2005; Boyd and Turton, 2000). Degradation is not uniform, even in the same landscape, but nevertheless an overall consensus seems to grow on the fact that many areas are getting substantially better. In a recent exchange of thoughts, Stocking (2006) stated that it is a debatable question whether the improving areas are improving because of soil and water conservation interventions or whether this has more to do with boserupian (Boserup *et al*, 2002) processes of innovation and adaptation. Over the past decade, significant advances have been made by researchers analyzing land rehabilitation efforts in these areas, and this special issue aims at presenting a representative set of studies.

2.2 The Scope and Impact of Land Degradation in Ethiopia

Ethiopia is among the poorest of countries and poverty and land and resource degradation appear to feed off each other. The irony is that Ethiopia is a country with high biodiversity and distinctive ecosystems and the natural resource base is critical to the economy and the livelihood of a high percentage of the population. Agriculture accounts for 50 percent of GDP, 85 per cent of foreign exchange earnings and supports, albeit insufficiently, 85 percent of the workforce. Estimates vary considerably but direct losses of productivity from land degradation are minimally 3 percent of agriculture GDP. With a population growth rate of 2.3 percent this is a critically important figure.

All physical and economic evidence shows that loss of land resource productivity is an important problem in Ethiopia and that with continued population growth the problem is likely to be even more important in the future. There are several studies that deal with land degradation at the national level in Ethiopia. These include the Highlands Reclamation Study: Ethiopia (EHRS- FAO 1986); studies by the National Conservation Strategy Secretariat (Sutcliffe 1993), the Ethiopian Forestry Action Plan (1993), and Keyser and Sonneveld (2001); Effect of Soil Degradation on Agricultural Productivity in Ethiopia.

Conclusions from these studies vary in detail. The EHRS concluded that water erosion (sheet and rill) was the most important process and that in mid-1980's 27 million ha or almost 50% of the highland area was significantly eroded, 14 million ha seriously eroded and over 2 million ha beyond reclamation. Erosion rates were estimated at 130 tons/ha/yr for cropland and 35

tons/ha/yr average for all land in the highlands, but even at the time these were regarded as high estimates. Sutcliffe produced new lower estimates for soil erosion, but emphasized the much greater importance of nutrient loss. The Ethiopian Forestry Action Plan outlines the pattern of deforestation. The current rate of deforestation is estimated at 150,000 ha per year (Ethiopian Forestry Action Plan) or 62,000 ha/yr (World Bank 2001). Forests in general have shrunk from covering 65% of the country and 90% of the highlands to 2.2% and 5.6% respectively.

2.3 Land degradation: Causes, impacts and rehabilitation techniques

2.3. 1 Causes of land degradation

Scholars identified different causes of land degradation. For example, according to Berry (2003), the cause of land degradation involves two interlocking complex systems: the natural ecosystem and the human social system. Interactions between the two systems determine the success or failure of resource management. While, WMO (2005) classified the causes of land degradation into biophysical factors such as unsuitable land use (land use for the purpose for which environmentally unsuited for sustainable use), socioeconomic factors such as poor land management practices, land tenure, marketing, institutional support, income and human health, and political factors such as lack of incentives and political instability. In parallel, Mulugeta (2004) argued that land degradation is a biophysical process driven by socioeconomic and political causes in which subsistence agriculture, poverty and illiteracy are important causes of land and environmental degradation in Ethiopia. While, Gebreyesus and Kirubel (2009) reported that the heavy reliance of some 85 percent of Ethiopia's growing population on an exploitative kind of subsistence agriculture is a major reason behind the current state of land degradation. Similarly, studies conducted by Temesgenet *al.* (2014a, b) in Dera District, Ethiopia exemplified the increased of land degradation which mainly caused by the growing population of the area. Additional study by Fitsumet *al.* (1999) illustrated that there are multiple interacting forces which have caused and are causing land degradation in Ethiopia. These are the proximate and interacting or root causes. Thus, the above classification indicates that land degradation in Ethiopia is caused by the interaction of many forces.

2.3.2 Impact of land degradation

Land degradation manifests itself in many different ways: vegetation becomes increasingly scarce, water courses dry up, thorny weeds predominate in once rich pastures, footpaths grow into gullies, and soils become thin and stony. All of these manifestations have potentially severe impacts on the environment, for land users and for people who rely for their living on the products from a healthy landscape (Berry 2003).

2.3.3 Socio-economic impact of land degradation

Land and water degradation threaten food security for many of the poorest and most food insecure living in Asia, Africa and Latin America. It also contributes to persistent poverty, and results in decreasing ecosystem resilience and provision of environmental services (Bossio *et al.* 2004). In addition, environmental decline due to land degradation adversely affects the health, well-being and livelihood opportunities of the individuals (Vivian *et al.* 1994; Scherr and Yadav 1996; Fitsum *et al.* 1999).

Due to the presence of land degradation, Africa as a whole has become a net food importer since the mid-1980s. However, the economic implications of land degradation are particularly severe in Sub-Saharan Africa because 65% of the population is rural and the main livelihood of about 90% of the population is agriculture (Project Development Facility 2007). The most serious problem of Ethiopia's land resources is soil erosion. Every year the country is losing billions of birr in the form of soil, nutrient, water and agro biodiversity losses (Getachew A 2005). As a result, poverty and food insecurity are concentrated in rural areas (Gete *et al.* 2008). Estimates vary considerably but direct losses of productivity from land degradation in Ethiopia are minimally 3 percent of agriculture GDP (Berry 2003). Land degradation is one of the major causes of low and in many places declining agricultural productivity and continuing food insecurity and rural poverty in Ethiopia (Girma 2001). The Ethiopian highlands are affected by deforestation and degraded soils, which have eroded the resource base and aggravated the repeated food shortages caused by drought (Tilahun *et al.* 2001).

Land degradation reduced livestock productivity as a result of reduced grazing resources, loss of nutritious plants and grass species (Fitsumet *al.* 1999). Due to land degradation, increased runoff and reduced infiltration contributes to flooding problem (Destaet *al.* 2000; Bezuayehuet *al.* 2002). Deforestation and desertification adversely affect agricultural productivity, the health of humans as well as of livestock, and economic activities such as ecotourism (UNCCD 2004). Similarly, Shibr (2010) reported that the loss of soil productivity in Limo *Woreda* leads to reduced farm income and food insecurity, particularly among the rural poor and thus continuing or worsening poverty. Land degradation can contribute directly to poverty by reducing the availability of other valuable goods and services important to poor households (for example, fuel wood, construction materials, wild foods, and medicinal plants) and by increasing the demands on labor needed to forage for such goods.

2.3.4 Ecological impact of land degradation

Land degradation has multiple and complex impacts on the global environment through a range of direct and indirect processes affecting a wide array of ecosystem functions and services (GEF 2006). The principal environmental impacts of land degradation include a rapid loss of habitat and biodiversity, modifications of water flows, and sedimentation of reservoirs and coastal zones (Project Development Facility 2007). The resultant ecological impacts of land degradation in Ethiopia include loss in the chemical, physical and/or biological properties of soil which directly affects the type of plant that are grown on the area, reduced availability of potable water, lessened volumes of surface water, depletion of aquifers due to lack of recharge, and biodiversity loss (Berry 2003). Similarly, Mulugeta (2004) also described that land degradation is threatening biological resources and agricultural productivity. Land degradation also interrupts the regulating and provisioning services of ecosystems, in particular nutrient cycling, the global carbon cycle and the hydrological cycle (GEF 2006). Generally, land degradation has a number of environmental impacts on regional and global level. First, degradation of forests and woodlands has impacts on global biodiversity. Second, changes in forest cover and wetlands are impacting the flow of major rivers. Third, large scale loss of forest cover changes the albedo and air circulation patterns and may affect global climate change. Fourth, soil erosion may cause excessive siltation in rivers and

inland lakes, causing reduced water storage capacity in lakes, as well as eutrophication and water quality problems (Project Development Facility 2007).

3. MATERIALS AND METHODS

3.1. Description of the Study Area

The study was conducted in Meinit Goldiya woreda, South West Ethiopia people regional state, Ethiopia It is located about 750 km from Addis Ababa toward south west. And it lies at 35^o, 29', and 50.55" to 36^o, 47', 33.28" east to west (latitude) and 35^o, 48', 50.57" to 35^o, 44', 43.30" north to south (longitude), the altitude of the study area is 1800 m.a.s.l and the area receives mean annual rainfall of 1950 mm with bimodal rainfall distribution (MGWFD, 2021).

3.1.1 Population

According to the woreda finance and economy report (2020), the population of Meinit Goldiya Woreda is 72,504 of which 36,527 (50.379%) and 35,977 (49.62%) are males and female respectively. With 10151 (14 %) classed as urban and 62353 (86 %) as rural population with the total area of 48 k.m².

3.1.2 Climate

The agro climatic zone of the district is moist Woinadega. The Annual rainfall in the area ranges from 1700-2000 mm, bimodal with the main rainy season from June to August and the short rainy season from late March to May, with mean annual temperature of 18°C (MGWFD, 2021).

3.1.3 Farming system

The farming system is largely characterized by mixed crop-livestock production and major cash crops include maize, sorghum and pulses. Another source of income is livestock production (SARDO 2010).

3.1.4 Livelihoods activities

The People of the area practice various livelihood and income generating activities. These include: crop cultivation (field crops and cash crops), livestock production, NTFPs collection and off-farm & off-forest activities. livestock production is mostly for income while honey and field crops are mainly

for household consumption. Maize, sorghums and taro are the major food crops produced. Maize is the dominant cereal and most frequently grown crop (WBRDA,2000).

3.2 Sampling design and data collection

3.2.1 Sample Size Determination

Population sample was determined according to Yamane (1967) formula, that at least 10% of households could participate in the research in each of the selected kebele for the study. The sample size of the studied household will be determined according to the equation given below

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

Where n is sample size

N is the number of household in the three kebeles and

e is the level of precision(i.e. the level of statistical significance, set at $\alpha = 0.1$).

$$n = \frac{1056}{1+1056(0.07)^2} = 97$$

A total of 97 households were randomly selected and interviewed in four kebeles.

Meinit Goldiya woreda encompasses 23 rural and 1 urban kebele, in the *woreda*, under 23 kebeles three kebeles(Chat, kurita, shokach, berbera) were purposely selected. There are 1056 households in the selected kebeles. Totally 97 households will be selected proportional to the size of the population as a household's survey data sources using random sampling techniques was employed.

3.3 Methods of data collection

3.1 Data Collection Techniques

The different data collection techniques were used in this study as described below.

Household questionnaire: Household questionnaire was enabled the researcher to capture multiple socio-economic and biophysical attributes in the study area. The questionnaire included questions on household characteristics, socioeconomic and farming conditions.

Household questionnaire Key informant interviews: Key informant interviews were carried out with the intention of capturing more firsthand socio-economic and biophysical data for the study. The key informants were the elderly, experts and development agents. Each interviews were carried out by the researcher with the aim of making further investigations on the basis of the information received from the household questioners.

Focus group discussion: The researchers administer the focus group discussion by telling the objectives of the study. Four focus group discussions were organized with a group size of 5-7 with DAs, experts and elders. While conducting the focus group discussion, the researchers recorded and took note for data analysis. For the purpose of data collection, three local enumerators (Diploma holders) will be recruited and trained to administer the questionnaire under close supervision of the researcher.

3.4 Method of Data Analysis

The goal of data analysis is to describe accurately what happened in the data. Data processing is an important part of the whole survey operation. It includes manual editing, coding, data entry, data cleaning and consistency checking. The researchers were used all these activities of data processing. Both quantitative and qualitative data analysis were employed in order to answer the research questions and to attain the objectives. Descriptive statistical tools were used to analyses the collected data.

4. Result and discussion

4.1 Socio Demographic Characteristics

The majority of the sample respondents (72%) were male, while the remaining (28%) were female. The household size of respondents ranges from 3 to 12 with the average of 7 members. The sample respondents were, on average, 33 years old. 47.1% of the respondents' educational level was illiterate, and the remaining 7.1%, 22.4% and 23.5% were from grade 5 to 8, 1-4 and 9-10 respectively (Table 1).

Table 1 Socio demographic characteristics of households

		Frequency	Percent
Sex	Male	68	74%
	Female	31	26.0%
	Total	97	100
Educational level	5--8	7	7.1%
	Illiterate	45	47.1%
	9-10	22	22.4%
	>11	23	23.5%
	Total	97	100

Education is an instrument for the socio-economic development of a nation. It is a basic parameter for any development activity particularly land management programs. This is because literate citizen can be better participants and involve in development targeted to land resource sustainability.

4.2 Farm size of the respondent

Regarding the size of the farmlands of the sample respondents, results from household inventory shows that about 54.2% of the household heads have farm lands greater than 3ha hectares and the remaining 37.4%, 3.8%, 3.4% and 1.2% household heads have farm land size ranging between 2-3, 1-2 , 0.5-1ha and less than 0.5 hectares respectively(Figure 1). This indicates that there is a land shortage problem in the study households which enforces them to farm frequently and puts more pressure on their farm lands and to cultivate a steep slope which aggravates the problems of soil erosion and reduction in soil fertility which leads to land degradation and insufficient crop production. . Similar study by Debrie M(2018) in North Ethiopia show that the household heads having farm land size ranging between 0.5-1 hectares represents 38 (70.4%) and the remaining 1.9%, 16.0% and 0.6% of household have farmlands ranging between 1-2, 3-4 and above 4 hectares respectively.

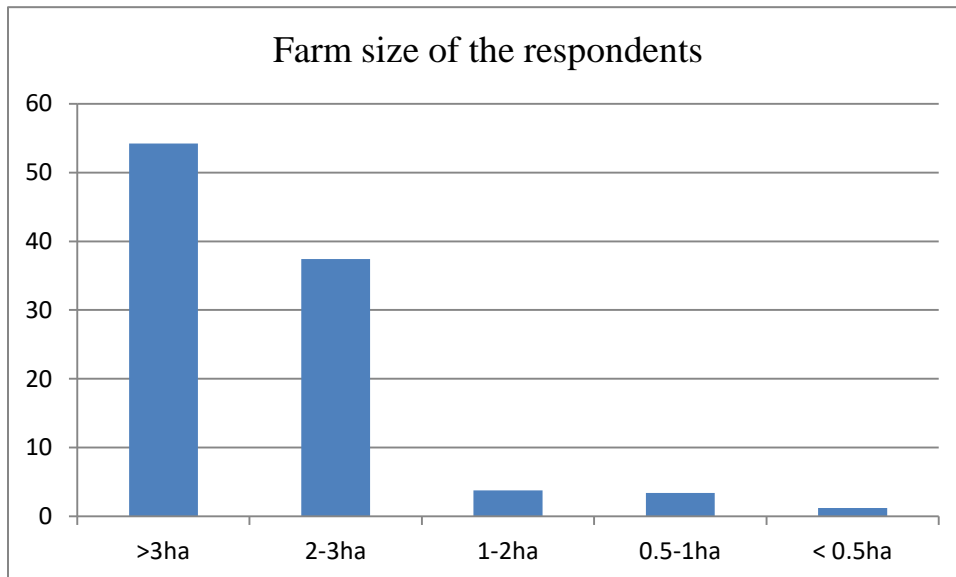


Figure 1 Farm size of the respondent

4.3 Economic Activity of the Respondent

The farming system in the study area can be described as mixed farming system. The livelihood of the people in the study area depended on livestock production, crop collection and off/non-farm

activities (petty trade and wage employment). When households asked to prioritize the most important activities to their livelihood in the study area, 82.7% of the respondents indicated that livestock production, was most important, followed by 15.8% crop production (growing Maize, Sorgom, rises, Taro, inset) and 1.5% off farm activities such as petty trade and daily labor (Figure 2). Findings from group discussion shows that the annual crops are mainly planted after the rains begin, allowing early rains to directly impact the soil contributing to high erosion levels. This indicates that most of the farmers in each target kebeles engaged in crop production using simple farming methods and production systems. As the result the main source of income for the household directly depends on land resource. Both crop and livestock production requires land and this aggravates the problem of land degradation in the study area. Additionally, as a population grows more fragile marginal lands are used. A further result of population growth is the reduction in fallow periods in the study areas.

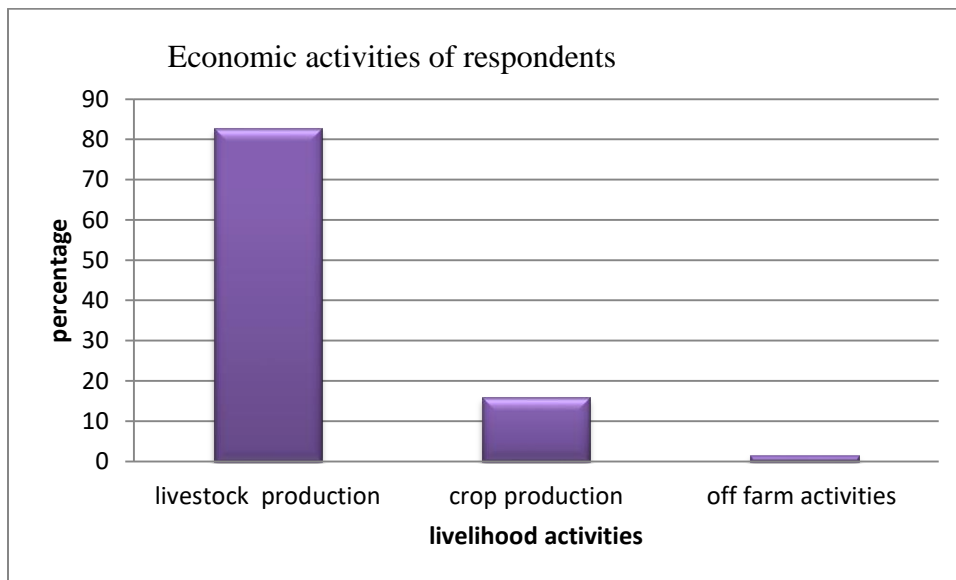


Figure 2 Economic activities of respondents

4.4 Occurrence of Land Degradation

To understand the extent of land degradation in the study area, respondents were asked to select whether or not land degradation happened in their locality. The survey result shows that About 186

(94.9%) of the sample household heads respond that there is a land degradation problem on their farmland and the remaining 5.1% household heads replied there is no land degradation on their farmland. This indicates that land degradation is the main problem for crop production in the study area which affects the livelihood of the farming communities. Findings from focus group discussion and key informant interview shows that land degradation has a long history starting from Derg regime and its rate of change is increasing from year to year and it requires a greater attention for the future in the study area. Getting new agricultural land is not a simple task and it can result in the expansion of farming activities to erosion-prone marginal areas, deforestation, a decrease of fallow period and continuous cultivation (Habtamu, 2006 & Hussien, 2006).

4.5 Perceived Indicators of land degradation

Regarding the indicators of land degradation, respondents were asked to show the indicators of land degradation, results of household inventory showed that about 75.2% of respondents replied that reduction of land productivity from year to year is the main indicator for land degradation in the study area and the remaining 21.4%, 2.3% 1.1% reduction of livestock productivity, reduction of water availability and occurrence of dynamic climate change respectively. A result of this study is in line with the finding by (Fitsum *et al.* 1999) that land degradation reduced livestock productivity as a result of reduced grazing resources, loss of nutritious plants and grass species. Similarly due to land degradation, increased runoff and reduced infiltration contributes to flooding problem (Desta *et al.* 2000; Bezuayehu *et al.* 2002).

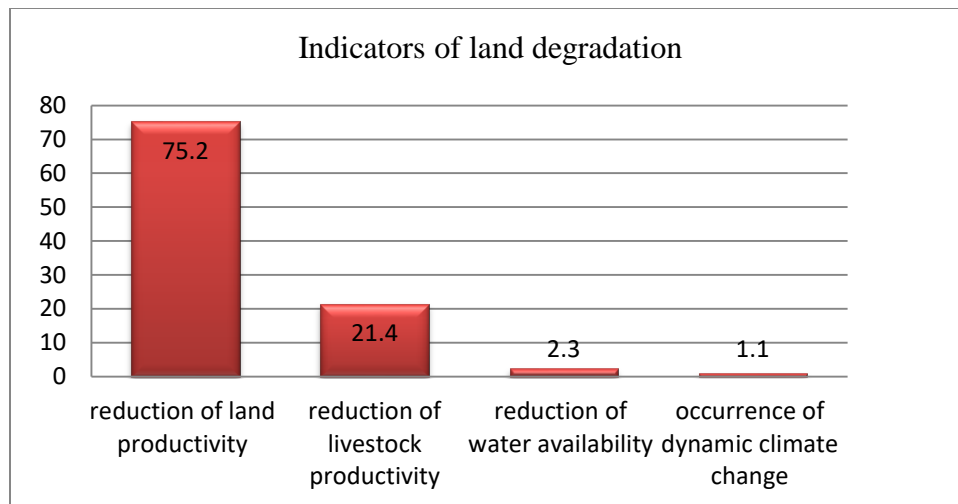


Fig 3 Indicators of land degradation

4.6 Causes of land degradation

To evaluate the main courses of land degradation in the study area, the researchers asked the survey households about main causes of land degradation and based on information from the survey result, out of the total sample studied households approximately 48.7% of the respondents replied that deforestation was main causes and the remaining 38.6%, 11.1% and 1.6% relied population growth, improper farming practice and overgrazing respectively. Moreover, the participant of focus group discussion replied that high population pressure and deforestation are the main factors which increase the magnitude of land degradation. High population pressure leads distribution of farmland and also forced the households to expand farmlands on marginal areas and expansion of farmland at the expense of vegetation and forest. So population pressure is the main triggering factor for the increasing magnitude of land degradation in each target kebeles. A similla finding by Lambin et al. 2001; Lambin and Meyfroidt 2011) shows that the driver of land-use change is the degradation of agricultural land, which can result in a negative cycle of natural land being converted to agricultural land to sustain production levels. The intensive management of agricultural land can lead to a loss of soil function, negatively impacting the many ecosystem services provided by soils including maintenance of water quality and soil carbon sequestration (Smith et al. 24 2016a). The degradation of soil quality due to cropping is of particular concern in

tropical regions, where it results in a loss of productive potential of the land, affecting regional food security and driving conversion of non-agricultural land, such as forestry, to agriculture (Lambin et al. 2003; Drescher et al. 2016; Van der Laan et al. 2017).

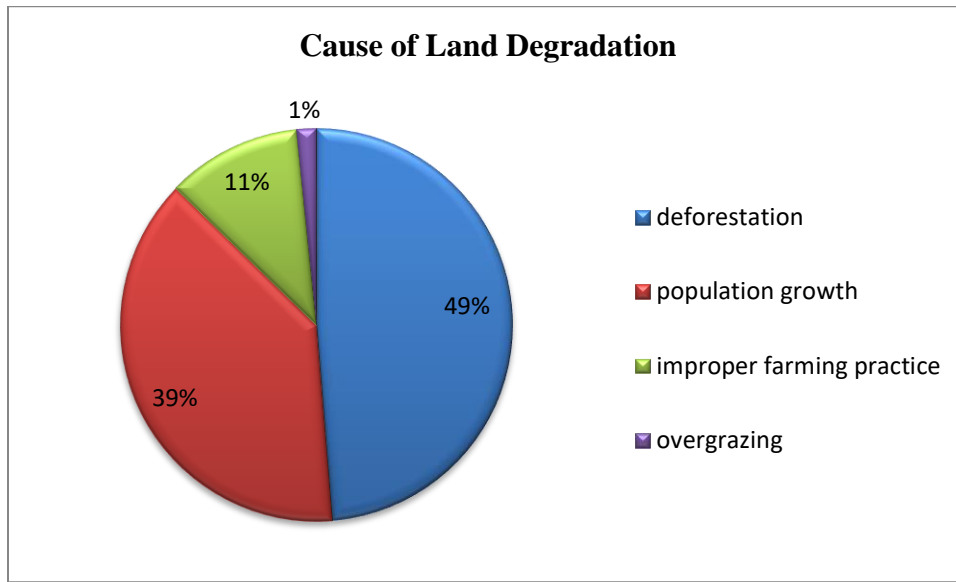


Fig 4 Cause of Land Degradation

4.7 Mechanisms of Land Rehabilitation to Restore Degraded Lands

To avoid the negative impacts of land degradation on the farm land of rural households several options need to be applied to tackle the problem. Regarding the rehabilitation mechanism of degraded farm land, the researcher asked the households to know the rehabilitation activities undertaken by the community. Based on information from the survey result, out of the total sample studied households approximately 39.8% of the respondents replied that physical soil and water conservation(soil bund constriction, funniyaju constriction), 54.6% biological soil and water conservation(tree planting, area closure, vativar grass planting, banana planting along couture and agroforestry) and 5.6% practicing contour tillage(figure 3). Findings from focus group discussion and key informant interview shows that water shade management activities like physical and biological soil conservation strategies were commonly applied in the study area for last ten years in

order to overcome the degraded farm land. Another similar study conducted in Kenya reported by (Scherr and Yadav 1996) land degradation can be prevented through different mechanisms depending up on the nature and form of degradation. Most types of soil degradation can be prevented or reversed by adding nutrients to nutrient depleted soil, rebuilding topsoil through soil amendments, reestablishing vegetation, or buffering soil acidity. In Ethiopia, rehabilitation starts with area closure that involves the protection and resting of severely degraded land to regenerate its productive capacity (Merkinah, 2017).

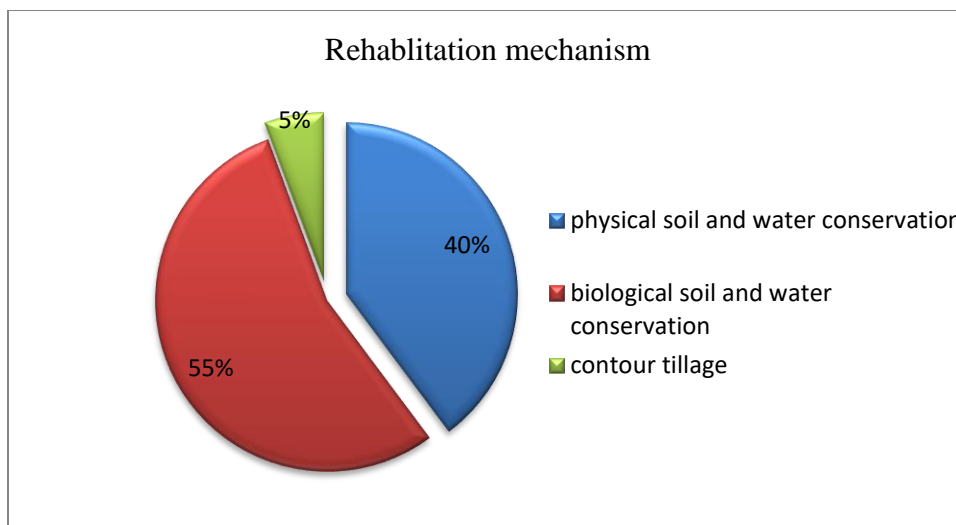


Figure 5 Rehabilitation mechanism

5. CONCLUSIONS RECOMMENDATION

5.1 Conclusion

Land degradation is a major global issue for the 20th century and will remain high on the international agenda even for the 21st century throughout the world today; depletion of natural resources is among the major problems facing human beings. Land resource degradation is the major environmental problem negatively affecting economic development in general and livelihood of the farming community in particular in Ethiopia. Rehabilitation strategies of degraded lands improve the overall ecological conditions of degraded areas so that they can

provide better socio-economic benefits and environmental services to the local communities. And also increase plant as well as animal biodiversity with time and after the establishment of rehabilitation measures on degraded lands. In areas where degraded lands and rehabilitation measures have been established enclosures are among the green spots with considerable species diversity. Rehabilitation of degraded lands requires designing economically feasible, socially acceptable and ecologically viable management and conservation strategies. Rehabilitation further improve soil quality, should be carefully evaluated because it may decrease the present support for Exclosures in the local population. Exclosures are not only effective in restoring vegetation, but also in improving soil nutrient status and reducing erosion. Reversing the degradation process requires comprehensive and cost effective program of conservation practices.

5.2 Recommendations

Based on the findings and conclusion of the study, the researchers suggested the following recommendations

- ❖ The concerned government body in the study area should give special *attention* to create awareness about the negative effects of land degradation on crop production and livelihood activities and also focus should be given on searching of alternative soil and water conservation rather than focusing on terracing.
- ❖ The livelihood of the farming community in the study area directly depends on the land resource for both crop and livestock productivity but the sustainability of their livelihood is affected by land degradation. So, focus should be given on introduction of non-farm incomes source rather than depending on the land resource.
- ❖ Training should be given to the farmers regarding the use of compost and its preparation in order to increase crop productivity on their farmland.

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