A Research Article On Assessing The Effect Of Human Impact On Plant And Soil Conservation On Hill Slope At Mecha Woreda West Gojjam Of Amhara Regional State

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Abstract: Degradation of ecosystem and subsequent reduction in services are major problems to sustain livelihoods in sub Sahara African region. As part of SSA Ethiopia faces various hurdles related in environmental degradation particularly in plant and soil conservation. Land is one of the most important assets. However conversion of natural vegetation and habitat destruction is main challenge in Mecha Woreda particularly in Addis Alem, Felege Hiwot and Midre Genet Kebeles. Although several stakeholders such as scientists, local and regional government bodies are working to improve plant and soil conservation, the problem persist in the study area due to inadequate efforts and various human induced negative impacts. This study aimed to identify the effect of human impact on plant and soil conservation, compare with similar area but model Kebele and come up at possible recommendation related with the effect of human impact on plant and soil conservation on hill slope. Three sites were selected purposely due to the fact that they are devoid of vegetation and highly eroded in the Woreda. Sampling design approach was used through stratified random sampling for farmers' questionnaire. Data was collected through field observation, interview, questionnaire and secondary data from recorded document. The data was organized through tabular and analyzed in frequency, percentage and figuratively. several factors contribute this study including poor socioeconomic conditions, cutting of tree for fire wood, charcoal production, home construction, furniture's and infrastructure expansion such as road construction. The result of the study showed soil erosion as a result of those human negative impacts. The present study showed severe soil erosion due to these anthropogenic factors.
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Chapter One

1. Introduction

1.1. Back ground of the study

Land is one of the most important assets to people throughout the whole world especially for life basically relied on agriculture (USAID, 2007). But this valuable property is being degraded due to soil erosion and nutrient depletion (Amsal & Graaff, 2007). Environmental such as potential loss of natural resources are negative effect resulting from the destruction of habitat (Borgerhaff & Coppolillo, 2005). Ethiopia being the land where the first human have evolved and its vegetation has been exposed to various human induced impact for a longer period than anywhere else (Tesfaye, 2007). The history of human use and abuse of ecosystem tells the story of adaptation to the changing condition that we create (Folke, 2005).

Environmental and natural resource degradation is a major concern in Ethiopia, because of its devastating effect on economic status of the people which are highly dependent on natural resources. The problem is particularly severe in the rural high land of Ethiopia (Girma, 2001).

Ethiopia is a country with great topographic feature and most part of the country consists of high plateau and mountain ranges with precipitous edges dissected by numerous streams which tributaries of major rivers (Dembel, 2002). Soil plant interaction posits that a change in soil condition causes change in the plant component which in turn causes further change in the soil and vice versa. In plant soil system, this implies that a plant induced change in the composition and activity of the soil biotic, physical or chemical properties, rate of ecosystem process, directly affect the plants (Ehrenfeld, 2005).

Natural resource degradation and soil erosion are some challenges to Ethiopia, human pressure has increase since the 1950's and has led to degradation expansion of agriculture into steep slope and over grazing. As a consequence, most of the hill slopes have become degraded in Ethiopia and most areas have become margined for crop production (Mulatie, 2009).

In most of the developing countries the major factor for land degradation is the improper and unsuitable land management due to population pressure land tenure insecurity, land redistribution, limited access to credit and limited education (IF PRI, 2005).

Resource over exploitation, inappropriate land use such as over grazing and deforestation are considered as major cause of land degradation (FAO, 2004).

1.2. Statement of the problem

The conversion of natural vegetation is currently one of the leading agenda for a number of world conservation organization authorities and interest group (UNDESA, 2004).

As has been noted above and is clarified in the later review of literature one problem area is the fact that plant and soil conservation face various hurdles due to human negative impact. In the face of the problems ecologists and conservation biologists have sought to protect vegetation using different strategies from strict protection in the national parks to suitable management and other integrated conservation and development programs (Borgerhoff & Copplillo, 2005).

Human population pressure, less awareness to conservation, socioeconomic factor leads to pressure associated with plant and soil conservation. To overcome the problem, Ethiopia has made efforts to launch a forestation and conservation program with the support of both government and nongovernment organizations. However, success to date has been limited (Bishaw, 2001).

The problem related with the effect of human impact on plant and soil conservation on hill slope needs better understanding why people interfere the conservation process while scientists and agricultural experts working in the positive aspect of conservation to continue. In essence, the effect of human impact varies considerable depending on the socioeconomic aspect, trend of the community and topographic arrangement. The attention given to plant conservation and sustainable use has so far been inadequate (Tesfaye, 2007).

Proper management and sustainable use of resources can be achieved successfully by bringing in conservation education through community participation; consequently conservation education would enhance local ecological knowledge and therefore help local communities realize their capacity respond to environmental challenges. This could be achieved through a proper extension of public education (Ayana, 2004).

The pervasive role of plant in the economic, environmental and social dimension of the human kind, global deforestation has remained a serious problem leading to environmental degradation. Tree cutting and charcoal making are livelihood activities of last resort (Asmare, 2012). It is these variances that lie at the heart of the problem areas proposed for this study. Moreover work experience i.e. as the researcher has been working for about three years around the selected Kebele of Mecha Woreda it helps to identify the problem and why it has been decided to be selected this as problem and chosen for study.

1.3. Objective of the study

1.3.1. General objective

The main objective of this study is to assess the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda West Gojjam of Amhara regional state, Ethiopia.

1.3.2. Specific objective

This study has the following specific objective;

- To identify the effect of human impact on plant and soil conservation on hill slope.
- To make comparison with other similar hill slope of model Kebele in the effect of human impact on plant and soil conservation.
- To come up with recommendation that may help in the conservation of plant and soil resource of the area in the later years.

1.4. Research questions

The study on assessing the effect of human impact on plant and soil conservation on hill slope at Mecha Worda West Gojjam of Amhara regional state was raised the following main research questions;

- What is the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda of selected hill slope?
- How much is the extent of experience sharing in the positive effect of human impact on plant and soil conservation from model Kebele?
- What are the possibilities that may help in conservation of plant and soil resource of the area in the latter years?

1.5. Significance of the study

The study on assessing the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda West Gojjam of Amhara regional state will have the following roles;

- ✓ It helps in identifying the effect of human impact on plant and soil conservation on hill slope.
- ✓ It helps to identify positive effect of human impact on plant and soil conservation from model Kebele.
- ✓ It helps to come up with recommendation that may help in the conservation of plant and soil resources of the area in the latter years.

Chapter Two

2. Review Of Related Literature

2.1. Socioeconomic service of vegetation

Economic values of forest are the basis of variety of industries including timber, paper, rubber and Fruit production. They also contain products that are necessary for communities including fuel production, construction material and medicines (FAO, 2005).

The energy consumption of rural Ethiopia is mainly based on biomass sources for which fuel wood being the highest component. The rural Ethiopia households entirely depend on biomass fuel to meet their energy requirement for cooking, heating and lighting (EARO, 2000). There is a severe and increase fuel wood gap in the country which leads to depletion of standing stock and hence, further degradation of the remaining forest stands (EPA, 1997).

2.2. Plant conservation

Establishment of protected area is vital for the purpose of educational, research and recreational value. Moreover, these areas provide such essential items as fuel wood, building material, forage, traditional medicine (Taddesse, 2003). The indirect benefit of plants include ecosystem protection, amenity, climate amelioration, nutrient cycling, hydrological cycle, water and waste purification and social and cultural values (Asmare, 2012).

It recognized that participation of communities for effective management of area enclosure is essential. The community should not simply be viewed as provider of free labor and observer of the changes brought forth by the enclosures, but rather should be actively involved in all stages of the process including benefiting from the changes (Asmare, 2012).

2.3. Human impact on plant conservation

Deforestation, increased runoff and soil erosion are the serious problems in Ethiopia. Rapid population growth, improper land resource management and utilization are the principal causes of increased runoff and soil erosion in Ethiopia. It has resulted in declining agricultural productivity, water scarcity and continuing food insecurity (Bishaw, 2001).

The land degradation has mainly resulted from improper resource management and traditional agricultural practices (El-Swaify, 1997; Lemenih *et al*., 2005; Nyssen *et al*., 2009). Deforestation and vegetation clearance were very high to fill the demand for additional cultivable and grazing lands (Puhr and Donoghue, 2000; Dubale, 2001; Feoli *et al*., 2002). Replacement of forest and grasslands on marginal lands with cultivation is followed by severe erosion and soil quality deterioration (Richter *et al*., 1999; Fu et al. 2003; Fu *et al*., 2008; Kalinina *et al*., 2009). A large part of the farmlands in the highlands substantially lost its productive potential a considerable amount (4%) of land reached a point of no-economic-return (FAO, 1986). Consequently, agricultural production declined at a high rate (Sonneveld and Keyzer, 2003). Annual agricultural production growth is estimated to be about 1.4%, which is much below the population growth rate (2.6%). This indicates that an over twofold gap exists between food demand and agricultural production (Sonneveld and Keyzer, 2003; Bingxin *et al*., 2010; Spielman *et al*., 2011). Thus, agricultural production rate has to grow from the current level to 3.6% (Sonneveld and Keyzer, 2003).

Likewise, land degradation in Ethiopia is largely associated with deforestation and destruction of biomass cover (Badege, 2001; Nyssen *et al*., 2009). Extensive forest resource degradation occurred between 1900 and 1960 (Pohjonen and Pukkala, 1990; EFAP, 1994) and has continued (Asefa *et al*., 2003). The leading causes of forest and vegetation destruction include expansion of agricultural land through shifting cultivation and the expansion of sedentary agriculture, increasing demand for Construction material, fuel wood and charcoal, and economic dependence of rural households on forest and its products (EFAP, 1994; Feoli *et al*., 2002). A large number of households generate income by selling firewood, charcoal and timber extracted through logging (Feoli *et al*., 2002). Nearly 82% of the country´s population obtains household energy from fuel wood, and about 13% of the energy comes from animal dung and crop residue (EFAP, 1994). This indicates that biomass directly or indirectly contributes to 95% of the household energy. Beside these factors, negligence (mainly forest fire), recurring droughts, wars, political instability, and lacking land tenure have contributed to accelerated deforestation and habitat degradation (Tefera *et al*., 2002; Tilahun 2006; Assen and Nigussie, 2009).

Natural resources are interdependent, and degradation of one affects the other. Biomass-cover change influences ecosystem services and processes (Wallace, 2007). Ecosystem services acquired from vegetation include provision, regulation, cultural and supporting services (Wallace, 2007). Hence, vegetation degradation influences those ecosystem services and processes. For example, vegetation degradation negatively influences soil formation, nutrient and water cycles, climate and erosion regulation, food supply, bio-chemical cycle and others (Wallace, 2007). Therefore, the impact of vegetation and forest cover destruction has a wide range of impacts (Richter *et al*., 1999; Lemenih *et al*., 2005; Wallace, 2007; Kalinina *et al*., 2009). The recurrent droughts, severe soil erosion, sedimentation of reservoirs and water bodies, soil quality deterioration, surface- and ground-water resource reduction and biodiversity loss are some of problems related to deforestation and vegetation clearance (Asefa *et al*., 2003; Lemenih *et al*., 2005). Vegetation cover degradation has also threatened the bio-diversity potential, and the plant seed reserve has also become

eroded due to surface cover clearance and soil degradation (Asefa *et al*., 2003; Khater *et al*., 2003; Wassie *et al*., 2009).

Deforestation is a large scale or partial scale removal of trees from forested areas, which may be deliberate or due to natural causes (Asamere, 2012).

Forest loss in Ethiopia attributed partly due to the subsistence oriented farmers unsustainable resource practices including clearing up of steep lands of vegetation cover in the guest fuel wood and crop land (Asamere, 2012).

The primary cause of deforestation is cutting trees in order to open up new farm land to feed the ever growing population (Asamere, 2012). Traditional fuels such as fire wood and biomass fill the energy needs of millions of people in developing countries like Ethiopia. Traditional fuels (fire wood, charcoal, leaves, straw, crop residues and animal dung contribute about 94% of the grass energy supply of Ethiopia (million, 2001).

Over grazing of herbage in the wood lands is another important impact of vegetation degradation. This is due to large herds of cattle arising from unwillingness among livestock owners and the fact that most of the forest wood lands are open access (not reserved). The effect of over grazing has been land degradation (soil compaction and broken soil crust) as well as reduces vegetation cover (Chamshama and Ndawayeza, 2002).

2.4. Human impact on soil conservation

As the world population has increased, the human race has had a growing impact on the environment of planet Earth. An example of this involves the influence of human activities on erosion. The stability of a landscape depends on the rate of soil lost by erosion, balanced against the rate of soil-forming factors such as rock weathering and leaf decomposition. However, a number of man's activities can cause acceleration of erosion, disturbing this natural balance (Ian Farquhar son, 1999).

Land degradation is defined differently by different authors. Some regard it as a synonym of soil degradation (Stocking and Murnaghan, 2000), while others explain the difficulty to define it because of its wider range and scope (Barrow, 1991). According to the United Nations Convention to Combat Desertification (UNCCD), land degradation is defined as a natural process or a human activity that causes the land to be unable to provide intended services for an extended time (FAO, 2004). The history of land degradation is as old as the human civilization, and has resulted in irreversible impacts in some cases. For example, the Atacama Desert once was a dense jungle (Kelley, 1983). At a global scale, agricultural land lost due to degradation is estimated at about 40% out of which agricultural land in developing countries accounts for the larger portion (FAO, 2004). Developing countries, especially in SSA, have been losing large tracts of land due to this problem (Nana-Sinkam, 1995; Scherr, 2000; Vlek *et al*., 2008).

Although there are no well documented or detailed studies concerning land degradation in Africa at the continental level, the few studies conducted at the exploratory level indicate the severity of the problem (Nana-Sinkam, 1995; Vlek *et al*., 2008). Nana-Sinkam, 1995) reported that whenever one has the opportunity to travel across various parts of SSA countries, it is easy to see that most inhabited parts are affected by the problem. A study of the FAO also indicated that out of the total land of Africa, 47% is too dry for rain fall agriculture and only 16% of the land has no serious fertility limitation, while the remaining 37% is affected by land degradation (FAO, 2004). The limited agricultural land on the continent has been shrinking due to land degradation. The rate in Africa is estimated at about 230 million ha annually (FAO, 2004). A satellite-data-based study also showed that SSA countries that are supposed to have agricultural potential are losing enormous areas of productive land due to the problem (Vlek *et al*., 2008). As in the other SSA countries, the problem is crucial in Ethiopia (Hurni, 1993; Dubale, 2001; Nyssen *et al*., 2004).

Land degradation started as early as the human history of animal domestication and control over fire (Lambin *et al*., 2003). Human activities have resulted in intended and unintended consequences for the environment. Anthropogenic forest fire was practiced during animal hunting in the earlier ages, and forest clearance for agriculture since recent times. These activities have resulted in a considerable impact on the environment beyond the intended extent and depth (Hurni, 1987; Lambin *et al*., 2003). The causes of land degradation are complex. Nevertheless, they are similar in many developing countries. Population pressure has been the major driver of the problem (Nana-Sinkam, 1995; Tekle, 1999; Scherr, 2000), and has resulted in extensive conversion of forest and vegetation-covered lands into cultivation and grazing land (Scherr, 2000). Conversion of forest and marginal lands to cultivation is followed by severe erosion. It was reported that severe deforestation in Ethiopia occurred between 1900´s and the 1980´s that resulted in a forest cover decline from 40% to 3%, and consequently, soil erosion reached at an alarming rate (Pohjonen and Pukkala, 1990; EFAP, 1994). The annual topsoil loss due to erosion in the Ethiopian highlands is estimated about 1 billion m^3 (Hurni, 1993).

The causes and effects of land degradation are complex, and have intermingled environmental impacts (Tadesse, 2001). Deterioration of crop

production particularly in the highlands is cited as a major and prime impact of the land degradation, where soil and soil nutrient loss due to erosion is a leading cause (Badege, 2001; Nyssen *et al*., 2009). Although the country has huge hydropower and irrigation potential, environmental degradation, particularly erosion and vegetation clearance in the highlands, is threatening this potential (Tadesse, 2001; Awulachew *et al.,* 2007). Degradation has also been influencing flora and fauna diversity and negatively impacted the micro-climate (Asefa *et al*., 2003; Tilahun, 2006). Decline of the forest cover also contributed to this problem (Tadesse, 2001). In recent times, frequent droughts, early end and late onset of the main rainy (*Kiremt*) season and failure of the smaller rainy (*Belg*) season are linked with climate change and land degradation, which could develop into desertification (Tilahun, 2006).

Soil degradation is reduction in the soil actual or potential uses due to problem on deforestation, overgrazing, population pressure and topographic. It is also caused by improper use of the ecosystem to provide services for its beneficiaries in densely settled region of the world (Abebe, 2015).

Forests provide a natural ground cover, which helps to hold soil in place and slow the rate of erosion. The roots of the trees and plants hold together soil particles, preventing them from being washed away (Sands, 2005). Agricultural activities can result in the acceleration of soil erosion. Crop growing requires fields to be cleared of vegetation and ploughed, and the bare earth this leaves can cause an increase in erosion. Unsustainable agricultural practices are the single greatest contributor to the global increase in erosion rates. Deforestation can therefore cause an acceleration of soil erosion, as it removes the natural vegetation and leaves areas of bare soil in its place.

Construction projects, such as highways, housing and industrial sites can occur over large areas, and these typically require the removal of natural vegetation. This has the potential to increase soil erosion during the construction period, as a result of storm water runoff. To combat this problem, many states have brought into law a Soil Erosion and Sediment Act, which requires that developers put in place adequate measures to limit the impact of construction on soil erosion and ensure this does not accelerate during the work (Ian Farquharson, 1999).

According to Abebe (2015) soil degradation is an important global agenda in the 21st century because of its negative impact on the environment. Soil erosion is a serious threat for environmental degradation in the mountainous land escape of the high lands of Ethiopia in both its economic costs and the areas affected. The hill slopes are under cultivation without using control measures and appropriate land management practices that result in low productivity, physical and ecological degradation. This part of the land increasingly experiences, high pressure for agricultural production and environmental sustainability (Gizaw, 2010).

Ecosystem function are directly and indirectly associated with soil. Soil gives clean air, water, bountiful crop, forest, productive range land, diverse wild life and beautiful landscapes (James, 2011).

Excessive stone removal for bund building lead to increased soil erosion. farmers always leave a critical amount of stones. One farmer said “If you put butter on one’s head, it is better if his/her head has hair to keep the butter, in the same way stone help to keep moisture”. This indicates that the negative impact if all stones are removed. Stone bunds keep soil, it protect the down slopes area from flooding (Nigussie & Mitiku, 2007). Determining the economic cost of soil erosion is extremely complex. Erosion can decrease rooting depth, soil fertility, organic matter in soil and plant available water reserves (Van keer, 2010). High population pressure relaying on natural resources coupled with poor land resource management practices and poverty resulted in severe soil erosion (Desale, and Binyam, 2015). Rain fall pattern or intensity, slope steepness, slope length, soil type, erosion control structure and ground cover are factor affecting soil erosion (Van keer, 2010).

2.5. Land-use/land-cover (LULC) change and its implications

Land use and land cover are interrelated but not synonyms (Jansen and Gregorio, 2003). Land use is defined as human modification of a natural environment or wilderness into a new environment such as agricultural fields, pasture and settlement, while land cover is the physical cover of the Earth surface that can be grass, water, forest, bare ground, crop field and others (FAO, 2000). LULC change occurs due to human and natural drivers. Human-induced changes are associated with socio-economic activities such as agriculture, mining, forestry, forest extraction, wars, settlement and policies. The natural drivers include weather and climatic fluctuations, ecosystem and geological dynamics, and others (Riebsame *et al.*, 1994). Humankind interacts with the environment for its wellbeing, and this determines the change direction to good or bad (FAO, 2000; Jansen and Gregorio, 2003; Aynekulu *et al*., 2009).

The major LULC changes in Ethiopia occurred in densely populated areas, mainly in the highlands (Amsalu *et al*., 2007; Assen and Nigussie, 2009). The changes were mainly conversion of forest and grasslands into cultivation and grazing. With the increasing population, large forest areas were destroyed and converted into agriculture in response to the ever increasing demand for food, grazing land and wood (Feoli *et al*., 2002; Assen and Nigussie, 2009).

Limited technology and livelihood options have aggravated the competition between different uses, and government policy and tenure have also played a considerable role (Tefera *et al.,* 2002; Assen and Nigussie, 2009). For example, during the emperor period, farmers used traditional shifting cultivation known as *Mofer-zemt Ersha*, where farmers clear forest to get new fertile farmlands (Amsalu *et al*., 2007; Mekonnen and Bluffstone, 2008).

On the other hand, the reform made land a state property where farmers were only given farmlands usufruct, while other lands remain public (common) property (Amsalu et al. 2007). This negatively influenced land management and utilization. Due to the commons, many marginal open areas were cleared to expand cultivation and grazing (Amsalu *et al*. 2007). After extensive deforestation, the government realized the problems caused by the reform and declared policy measures in 1980s intended to reduce deforestation and restore degraded lands. Nevertheless, there are no studies that adequately address the LULC change in the country (Teferea *et al*. 2002).

Chapter Three

3. Research Methods

3.1. Description of the study area

Mecha is one of the Woredas in the West Gojjam administrative zone of Amhara region. The Woreda is bordered by Yilmana Densa Woreda to the East, South Achefer Woreda to the West, Bahir Dar Zuria Woreda to the North and Sekela Woreda to the South. Mecha Woreda is located at 500 km northwest of Addis Ababa, the capital of Ethiopia and 35km to the west of Bahir Dar, the capital of Amhara region.

The Woreda is divided in 39 rural and 4 urban Kebeles. In 2007 the population of Mecha was 336,697 in rural areas and 27,637 in urban areas, a total of 364,334, of which 181,228 were females (CSA, 2007). The Woreda have 324,316 grazing animal [number]. The majority of the inhabitants practiced Ethiopian Orthodox Christianity, with 98.84% reporting that as their religion, while 1.09% was Muslim. The study area located between $37^0 0' 0''$ E and $37^0 20' 0''$, $11^0 10' 0''$ N and $11^0 30' 0''$ N.

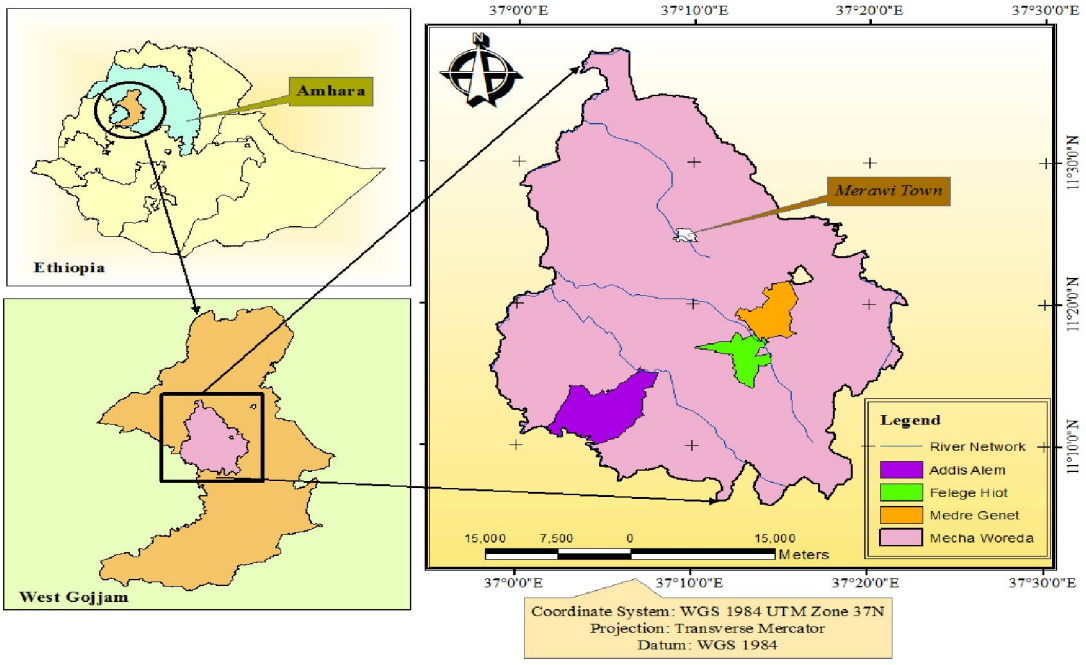

Figure 1: Map of the study area

3.2. Climate

According to Mecha Woreda agricultural and natural resource office, the climatic condition of the Woreda is 2% kolla, 18% dega and 80% woinadega. The Woreda's temperature condition is 24-27cº and 1000-2000 mm annual rain fall.

3.3. Topography.

According to Mecha Woreda agricultural and natural resource office, the topographic arrangement is 4% valley, 8% mountainous, 13% hill slope and 75% gently sloped. The altitude of the Woreda rises from 1500-2500m above sea level.

3.4. Land coverage and land uses of the study area

According to Mecha Woreda agricultural and natural resource office, the total land coverage of the

Woreda is 159899 hectare. The land that covered by forest land is only 9541 hectare. The potential that could cover by forest is 12997 hectare, 73139 hectare used for crop production, 14987 hectare using for grazing, the remaining 49499 hectare uses for home construction and others. About 92% of the Woreda's economy is dependent on Agriculture. The main products are maize, teff, millet and 'dagussa'. The most dominant is a nitisol that covers 92% of the area, and the remaining soils vertisols and vertic nitisols. Seventy five percent of the study area is gently sloping, 13% is hill slope and 8% mountainous, while 4% consists of valleys. Agriculture involving mixed farming of crops and livestock farms is the basis of the economy population inhabiting the Woreda. Deforestation is one of the serious problems in the study area as observed during the site assessment and observation. Most of the hill slopes are devoid of vegetation as a result of continued destruction of the natural forest without management and protection. Farmers within the study areas chop down tree to obtain wood for fuel, construction, and infrastructure and free domestic animal grazing. Deforestation has serious far-reaching consequences, including increasing surface run-off with severe erosion.

3.5. Site selection

The study on assessing the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda West Gojjam of Amhara regional state was selected three sites i.e. Feleg Hiwot, Addis Alem and Midre Genet. The site was selected purposely due to the fact that these sites are highly eroded areas in the Woreda.

3.6. Sampling design approach

The study on assessing the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda West Gojjam of Amhara regional state was conducted by using stratified random sampling approach. Three Kebele was taken for the study in Mecha Woreda. From the selected site Addis Alem Kebele is one that has 1827 male and 1865 female residence population. From this Kebele Gomchie hill slope that has 98 male and 119 Female residence populations was selected. Using stratified sampling 30 male and 36 female residence farmers was selected for questionnaire. The second selected Kebele is Felege Hiwot that has 1028 male and 718 female residence population. From this Kebele Asabel hill slope that has 77 male and 60 female residence populations was selected. Using stratified sampling 24 male and 18 female residence farmers was selected for questionnaire. The third selected Kebele is Midre Genet that has 1085 male and 994 female residence population. From this Kebele Wawa hill slope that has 118 male and 139 female residence populations was selected. Using stratified sampling 36 male and 42 female residence farmers was selected for questionnaire. Totally 186 sampled respondents were selected for questions from the three hill slope Kebeles.

3.7. Data collecting technique

The study on assessing the effect of human impact on plant and soil conservation on hill slope at Mecha Woreda West Gojjam of Amhara regional state was conducted by collecting data through field observation, interview, questionnaire, and secondary data from recorded document of the Mecha Woreda agricultural and natural resource office as well as Kebeles. Primary data was collected through field observation, key informant interview given for three agricultural experts in the selected sampled Kebeles, questionnaire from farmers and secondary data from recorded documents of the Woreda agricultural office and from selected sites.

3.8. Data Analysis method

Descriptive statistics based on percentages was used to analyze findings. Qualitative data collected from households using structured questionnaire, interviews and observations was organized and entered in to cross tabulation. In the selected Kebeles each respondent i.e. the male and female respondents were collected and organized so that the situation in each selected Kebele for the different questions in the questionnaire was analyzed. Questions in the questionnaires was computed during the analysis and presented through tabular in frequency, percentage and the data collected from observation presented figuratively.

Chapter Four

4. Result And Discussion

4.1. Socioeconomic aspect of the community

According to the data collected from respondents' questionnaire almost all of the people living around the selected hill slope depend up on crop production and animal farming that was about 99% and few people live on traders. Crop production for their persistence life was the base of their economy.

The communities living in the selected hill slope highly rely economically and culturally on animal production as well. As data collected from interview the people that live around the hill slope considered as rich, if they have high number of domestic animals that indicates culturally and psychological pressure. As has been observed and data obtained from the interview also indicates that the socioeconomic aspect of the community that live in the selected hill slope depends mainly on crop production and animal farming.

Figure 2: Socioeconomic aspect of the community

4.2. Community awareness to planting, protecting and supporting seedlings

According to farmers response about 91% of the people that live around the hill slope responded at low in awareness of planting, protecting and supporting seedlings.

As has been collected data from observation an agricultural expert interview the awareness of the community in planting, protecting and support of seedlings was low.

Table 1: Community awareness to planting and supporting seedlings

Selected sites	Human awareness of planting seedlings			Extent of human in protecting and supporting seedlings		
	Frequencies			Frequencies		
	Low	Medium	High	Low	Medium	High
Addis Alem	61	3	2	59	4	3
Felege Hiwot	38	3	1	38	2	2
Midre Genet	71	4	3	73	3	2
Total	170	10	6	170	9	7
%	91.39	5.37	3.23	91.39	4.84	3.76

4.3. Community participation in terracing and protecting the terraced area

According to respondents idea although farmers who live around the hill slope about 50% responded as they participate moderately, but about 91% responded at low in the habit of protection the terraced lands. As data collected from agricultural expert interview and observation the communities that live around the selected hill slope have no good habit on protecting the terraced hill slope areas.

4.4. Community attitude on plant and soil conservation

Farmers' response showed that people's trend to plant and soil conservation about 89% responded at low. Moreover about 91% of the respondents responded as they were low at awareness on plant and soil conservation. In addition to this as data collected via questionnaire from farmers, it was low at ownership that was about 94%. Moreover about 94% responded at low in acceptance to plant and soil conservation on hill slope.

According to respondents the community that live around the selected hill slope responded about 92% at low related in considering to next generation on plant and soil conservation around the hill slope. Moreover the data collected via from agricultural expert interview and observation strengthened the data which collected from the farmers via questionnaire.

Table 2: community participation in terracing on hill slope

Selected Sites	Extent of human participation in terracing on hill slope			Extent of human in protecting and supporting terraced hill slope areas		
	Frequency			Frequency		
	Low	Medium	High	Low	Medium	High
Addis Alem	12	29	25	63	2	1
Feleg Hiwot	7	22	13	38	3	1
Midre Genet	12	42	24	69	6	3
Total	31	93	62	170	11	5
%	16.66	50	33.33	91.39	5.91	2.69

Table 3: community attitude on plant and soil conservation

Selected Sites	Extent of human awareness on plant and soil conservation			Human trends on plant and soil conservation on hill slope			Extent of human ownership on plant and soil conservation			Human acceptance on plant & soil conservation			Human consideration on next generation in plant & soil conservation		
	Frequency			Frequency			Frequency			Frequency			Frequency		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	low	Medium	High	Low	Medium	High
Addis Alem	61	4	1	61	4	1	63	1	2	60	4	2	62	3	1
Felege Hiwot	36	5	1	37	4	1	41	1	0	40	2	0	39	3	0
Midre Genet	72	4	2	68	7	3	70	7	1	74	4	0	71	5	2
Total	169	13	4	166	15	5	174	9	3	174	10	2	172	11	3
%	91	6.99	2.15	89.25	8.O6	2.69	94	4.8	1.6	94	5.4	1	92	5.9	1.7

4.5. The effect of human impact on plant and soil conservation on hill slope

4.5.1. Human impact on plant and soil conservation

As data collected from farmers via questionnaire there were many pressure that can be consider as a negative human impact on plant and soil conservation.

Free domestic animal grazing

According to data collected from farmers via questionnaire free domestic animal grazing practice around the selected hill slope indicated that about 78% responded at high. The trend as well about 91% responded at high. Due to the free animal grazing the negative impact up on plant and soil conservation was about 90% responded at high.

According to the farmers response that collected data via questionnaire the interest of farmers to reduce the number of free animal grazing was about 92% responded at low. Moreover the way of handling free animal grazing about 91% responded at low.

Moreover the interest of farmers to reduce free animal grazing was about 95% responded at low. In addition to this the agricultural expert support and follow up in reducing the impact of free animal grazing was about 91% responded at low.

In addition to this the data collected from the interview and observation also indicates that free animal grazing is major problem in the selected hill slope but low at the interest of reducing it. As data collected from document analysis of the selected Kebeles there were high number of domestic animal which obtaining their feed through free grazing i.e. totally about 36,225 animals.

Table 4: The impact of free animal grazing on plant and soil conservation

Questionnaire Items			Selected Sites				
			Addis Alem	Felge Hiot	Medre Genet	Total	%
Extent of free animal grazing practice	Frequency	Low	*29*	O	2	31	16.66
		Medium	4	2	4	10	5.38
		High	33	40	72	145	78
Trend in using free animal grazing	Frequency	Low	2	1	4	7	3.8
		Medium	4	1	5	10	5.38
		High	60	40	69	169	91
Impact of free animal grazing on plant and soil conservation	Frequency	Low	2	3	3	8	4.3
		Medium	3	3	5	11	5.9
		High	61	36	70	167	90
Human interest to reduce free grazing animal number	Frequency	Low	60	38	73	171	92
		Medium	5	2	4	11	5.9
		High	1	2	1	4	2.15
Extent of human handling to grazing Animal	Frequency	Low	62	37	71	170	91
		Medium	2	5	5	12	6.4
		High	2	0	2	4	2.15
Human interest to reduce free grazing	Frequency	Low	62	39	75	176	95
		Medium	3	3	2	8	4
		High	1	0	1	2	1
Extent of expert support and follow up in reducing effect of free animal grazing impact to plant and soil conservation	Frequency	Low	60	39	71	170	91
		Medium	4	3	4	11	5.9
		High	2	0	3	5	2.7

Figure 3: Free animal grazing practice

Cutting tree for different purpose

According to farmers' response plants of the selected hill slope was cutting for the purpose of;

Fire wood and charcoal production

As data collected via questionnaire from the people that live around the hill slope about 75% responded at medium in cutting trees for the purpose of fire wood and about 82% responded at high in cutting tree for charcoal production. Moreover about 88% responded at high in cutting trees for traditional practice such as smoke by considering as it can remove evil plants like *Olea europaea* L. and *Otostegia integrifolia* Benth.

The data collected from agricultural expert, interview and observation also support the farmers' response.

Figure 4: Human impact on plant conservation by cutting for fire and smoke.

For construction material and house hold furniture

According to farmers' response through questionnaire in the selected hill slope about 93% responded at high in cutting tree for the purpose of construction and house hold furniture. The data collected from agricultural expert via interview and observation also strengthened it as the community cut plants for home construction and different house hold materials.

Figure 5: The impact of human by cutting plant for construction material and household furniture

For infrastructure

According to the data collected from farmers via questionnaire the extent of giving priority to plant and soil conservation in infrastructure such as road construction was low and the extent of human negative impact by doing road construction on plant and soil conservation was about 93% responded at high.

Figure 6: Human pressure on plant & soil conservation via infrastructure expansion.

Table 6: Extent of soil erosion & activities to reduce its impact

Selected site	Trend of human in cutting of plant for fire wood			Human trend in cutting plant for charcoal production			Human trend in cutting trees for smoke			Human trend in cutting of plant for construction, furniture and extent of plant destruction for infrastructure		
	Frequency			Frequency			Frequency			Frequency		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
AddisAlem	3	61	2	3	8	55	0	5	61	1	3	62
Felege Hiwot	1	41	0	2	6	34	3	7	32	2	2	38
Midre Genet	4	38	36	4	10	64	3	5	70	1	4	73
Total	8	140	38	9	24	153	6	17	163	4	9	173
%	4.3	75	20.7	4.8	12.9	82	3	9	89	2.2	4.8	93

As data collected via field observation and interview the major impact of human beings on plant and soil conservation on hill slope of the selected Kebeles were;

- ✓ Cutting tree: for fire wood, charcoal, home construction, house hold furniture, agricultural materials, timber production and traditional practices such as smoke.
- ✓ Free animal grazing.
- ✓ Improper land use: for crop production and road construction.

4.5.2. The effect of human impact on plant and soil conservation

As data collected from farmers via questionnaire the effect of human being due to the negative impact of free animal grazing, cutting of tree for energy consumption as well as construction material and infrastructure such as road construction is about 96% responded at high. The open ended questionnaire and data collected from agricultural expert via interview and observation also strengthened the above idea and indicated as soil erosion was the main effect of human impact on plant and soil conservation.

4.6. Extent of soil erosion

The extent of soil erosion around the selected hill slope indicates that about 98% responded at high as data collected from farmers' questionnaire. This data also strengthened by field observation and interview.

Soil erosion is a naturally occurring process that can be a slow relatively unnoticed or can occur at an alarming rate which depends on slope gradient, plant cover and tillage operation (Jim, 2015). Higher rainfall, high slope steepness, poorly established erosion control structures and low ground plant cover accelerate soil erosion (CAR, 2010). Removal of original vegetation, road building, timber harvesting and disturbing mature vegetation for whatever reason have significant impact in maintaining an environment which increase rate of soil erosion (EEAM, 1998).

Generally the result of the study showed that a collective human negative impact on plant and soil conservation on hill slope resulted to high effect. This implies the effect of human impact on plant and soil conservation on hill slope was soil erosion. The data collected via field observation and interview also strengthened this i.e. soil erosion.

Figure 7: Extent of soil erosion from the selected Kebele

4.7. Farmers practice to reduce soil erosion

As data collected from the farmer's questionnaire the extent of community practice to reduce soil erosion was about 94% responded at low.

4.8. Stakeholders support to reduce soil erosion

According to the farmers respond through questionnaire the extent of agricultural expert to support, follow up and experience sharing to reduce soil erosion in the selected hill slope indicates that about 90% responded at low. The cooperation of all stakeholders to reduce soil erosion was about 91% also responded at low.

Table 5: Human pressure on plant & soil conservation on hill slope

Selected site	Extent of soil erosion on hill slope			Extent of human practice to reduce soil erosion			Expert experience sharing to reduce soil erosion			All stakeholder cooperation in reducing soil erosion		
	Frequency			Frequency			Frequency			Frequency		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Addis Alem	0	0	66	61	4	1	61	3	2	61	3	2
Felege Hiwot	0	1	41	39	3	0	37	3	2	39	2	1
Midre Genet	0	2	76	74	2	2	70	5	3	70	5	3
TOTAL	0	3	183	174	9	3	167	11	7	170	10	6
%	0	1.6	98.4	94	4.8	1.6	90.3	5.9	3.8	91.4	5.4	3.2

4.9. Environmental sustainability

As data collected from the selected site via farmers' questionnaire the extent of all stakeholders' cooperation in using the soil resource and to reduce soil erosion around the hill slope indicated that about 91% responded at low.

4.10. Positive effect of human impact on plant and soil conservation on hill slope of model kebele

As data collected via interview and field observation from selected hill slope that i.e. Birakat Kebele the community that live around the particular area have good awareness at planting, protecting and supporting seedlings. Moreover they have better participation in terracing and protecting the terraced land of the hill slope.

According to the data collected from the model Kebele through interview and observation, the community was good at feeling of ownership, cooperation, acceptance of expert advice and consideration to next generation on plant and soil conservation on hill slope. In addition they have better way of handling of domestic animal grazing and agricultural expert support as well as follow up. As data collected via interview and field observation, free grazing of domestic animal is 100% stopped.

Moreover they used alternative way of energy source such as solar, animal dung and biogas rather than cutting plants for fire woods and charcoal production. Furthermore cutting of plants for construction material and other house hold furniture was in a proper manner.

As data collected from the model Kebele, during observation and interview there was no more human negative impact on plant and soil conservation of the hill slope. This implies that effect of human negative impact on plant and soil conservation on hill slope which is soil erosion no more observed.

Generally having cooperative and holistic participation related on plant and soil conservation makes to be model kebele and takes rewarded zonal, regionally, and federally in 2015.

Chapter Five

5. Conclusion And Recommendations

5.1. Conclusion

Beside to positive impact of human beings on plant and soil conservation, the study indicates there also negative human impact on plant and soil conservation on hill slope.

It was observed that farmers depend on plant to obtain their energy consumption in the form of fire wood and charcoal production by cutting plants. Therefore they use as a source of energy for themselves and sell for other people to get money so as to buy other materials.

Farmers also cut plant for the purpose of construction materials house hold furniture. Moreover farmer cut tree for traditional practice such as smoke by considering as it can avoid evil trees like *Olea europaea* L. and *Otostegia integrifolia* Benth..

The other human negative impact on plant and soil conservation on hill slope was for infrastructure such as road construction. Although road construction expansion is good for a society which used as transport system, consideration and giving priority to natural resource such as plant and soil resource was limited. During road construction destruction of plant also observed. Moreover consideration has not given in building water way (canal) for flood which also has an impact on soil resource of the selected hill slope.

Free animal grazing was also the major problem that consider as a negative human impact on plant and soil conservation on hill slope. Farmers of the selected hill slope are culturally and economically dependent up on the domestic animals such as cattle, sheep, horse, mule, goat and donkey. They consider as matter of expressing rich.

When domestic animal feed on plants of the hill slope over and over again their continuous trampling and breaking leads to loosen the upper soil surface making it more vulnerable to degrade which taken away either by wind or water.

Figure 8: Positive effect of human impact on plant and soil conservation on hill slope of model Kebele

Free animal grazing destruct plant mainly young trees and lands of terraced hill slope. Problem related in land use also has human negative impact on plant and soil conservation on hill slope. Using the land of the hill slope for crop production also observed. Using over and over again for crop production that is over exploitation due to agricultural practice also consider as negative human impact to plant and soil conservation on hill slope rather than leaving free from any human and animal contact to grow plants.

Generally the result of the study showed that human beings have negative impact in the selected hill slope due to collective pressure such as less awareness in management of plant and soil resource. Less commitment and taking responsibility to protect the plant and soil resource for that found around the selected hill slope. Local land administrators are weak in applying related rules for those people who do not respect it and destruct plants. Moreover it also connected to short period personal benefit rather than thinking to long term environmental benefit in using

the resources in a sustainable manner. This is critical fall in life saving aid and in reduction of environmental problem.

Environmental security right was given less consideration. The society that lives around the selected hill slope usually cannot ask local land administrative authority to use properly and planting seedlings. Awareness has forgotten associated with questions "who benefit from conservation of plant and soil resources." Moreover it was limited in considering conservation of plant and soil resources as having great role in maintaining an ecosystem balance as a result of interacting organisms with one another and the physical environment. Understanding as plants carry out the process of photosynthesis which was important for rainfall through transpiration stabilizing the atmosphere and plant root hold the soil which avoids soil degradation by flooding was low to people who live in the area of the hill slope.

In the context of the study area of selected hill slope of Mecha Woreda;

- ❖ Destruction of plant happens through free grazing of domestic animal.
- ❖ Cutting of plant for cultivation of crops.
- ❖ Cutting of plants for fire woods and charcoal production.
- ❖ Cutting of plants for timber production.
- ❖ Cutting of plants for home construction.
- ❖ Destruction of tree during road construction occurred.

Even rehabilitating measures through planting seedlings and educating the society in supporting and follow up was no more noticed. Conservation of plant and soil resource by considering ethical and practical reason was low.

The effect of human negative impact on plant and soil conservation around the selected hill slope was soil erosion. Although soil erosion is a natural process, but human interference aggravate through cultivation, free domestic animal grazing and other interference such as removal of plant cover. In deed there has been more erosion. Soil erosion was serious ecological problem in the selected hill slope. Soil erosion takes away the precious soil resources which are the basic of agricultural production on which the community of the selected hill slope depends. The implication of soil erosion could be reduction in agricultural productivity.

5.2. Recommendations

From a clear understanding of the problem of soil erosion not only from the point of effect on livelihood, but also from the point of environmental sustainability and wellbeing of the ecosystem, a comprehensive program of land management intervention should be implemented to avoid further damage. This will entail mobilizing resources experts and the community at large. It is imperative to assess the effect of human impact on plant and soil conservation implications of soil erosion and deforestation together with the costs that need to be incurred to remedy the situation. Community participation needs to make different embarking on natural resource management instead of merely rehabilitating degraded lands which used up precious resources. The notion of prevention is better than cure undeniable applies. The study on assessing the effect of human impact on plant and soil conservation on hill slope included the following recommendation;

- ✓ Community must have good awareness at planting, protecting and supporting plant resource.
- ✓ It should have better at community participation in terracing and protecting the terraced hill slope.
- ✓ Community attitude should be well oriented related to plant and soil conservation on hill slope in feeling of ownership, coordination, agricultural expert advice acceptance and consideration to next generation.
- ✓ It should have proper handling in grazing domestic animal.
- ✓ The community should have alternative energy source for their daily consumption such as solar, animal dung and biogas rather than using fire wood and charcoal by cutting plants.
- ✓ Manageable and proper use of plant resource for home construction and house hold furniture is needed.
- ✓ It needed to construct water ways (canal) in infrastructure expansion such as road construction and appropriate land management.
- ✓ It should have collective response to collective impact.
- ✓ Encouragement of positive attitude and becoming alert to negative human impact and zero tolerance is needed.
- ✓ Advocating an adaptive ecosystem approach is needed.
- ✓ It should have multitude of impressive and target full approach.
- ✓ Strengthening in using local potential and opportunity in a wise manner.
- ✓ Solidarity and working closely together with the residence people require.
- ✓ Must have better and effective erosion control technique and needs to look after.
- ✓ It needs to have habit of one and the same sound in plant and soil conservation.
- ✓ Strengthening the youngster awareness seeking to practice alternative way of economic source.

✓ Addressing different scientific researches that has done related to the effect of human impact on plant and soil conservation.

Generally it should have cooperative and holistic participation in plant and soil conservation as well as sustainable use of environmental resource such as plant and soil resource particularly area of the hill slope.

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Abbreviations

CARDI	Caribbean Agricultural Research Development Institution
CAR	Caribbean Agricultural Research
CSA	Central Statistical Agency
EARO	Ethiopia Agricultural Research Organization
EEAM	Environmental Education Assessment and Management
EFAP	Ethiopia Forestry Action Program
EHRS	Ethiopia High land Reclamation Study
EPA	Environmental Protection Authority
FAO	Food and Agricultural Organization
IFPRI	International Food Policy Research Institution
LULC	Land use /land cover
SSA	Sub Saharan Africa
UNCCD	United Nation Convention to Combat Desertification
UNDESA	United Nation Department of Economic and Social Affairs
UNEP	United Nation Economic Program
USAID	United States Agency for International Development

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Appendix A

Questionnaire For Residents/Households

Respondents' Gender Male------ Female-------

This questionnaire is to be filled by farmers. Dear respondent please put the sign circle (0) form the given alternatives. Unit (clue) 1= low 2= medium 3 = high

1. The human awareness of planting seedlings is 1 2 3
2. The extent of human in protecting & supporting of seedlings 1 2 3
3. The extent of human participation in terracing is 1 2 3
4. The extent of human protecting & supporting terraced of hill slop is 1 2 3
5. The extent of human awareness on plant & soil conservation on hill slope is 1 2 3
6. The extent of human trend on plant & soil conservation on hill slope is 1 2 3
7. The extent of human ownerless on plant & soil conservation on hill slope is 1 2 3
8. The extent of human cooperation on plant & soil conservation on hill slope is 1 2 3
9. The extent of human consideration to next generation related to plant & soil resource is 1 2 3
10. The extent of human impact to plant & soil conservation on hill slope is 1 2 3
11. The effect of human impact to plant & soil conservation on hill slope is 1 2 3
12. The extent of human acceptance to plant & soil conservation on sill slope is 1 2 3
13. The extent of free grazing practice on hill slope is 1 2 3
14. The extent of human beneficially from plants of hill slope is 1 2 3
15. The extent of human awareness as being beneficially from plant conservation on hill slope is 1 2 3
16. The trend of human proper land use of hill slope is 1 2 3
17. The extend of human awareness to give prior consideration to plant & soil conservation in doing road & other construction on hill slope is 1 2 3
18. The extent of human impact doing road & other construction of social service (institution) on hill slope is 1 2 3
19. The effect of human impact is doing road & other construction of social service (institution) on hill slope is 1 2 3
20. The extent of expert awareness on the impact to plant & soil conservation on hill slope is 1 2 3
21. The extent of expert awareness to the effect of human impact on plant and soil conservation on hill slope is 1 2 3
22. The extent of expert support & follow up in reducing the effect of human impact to plant & soil conservation on hill slope is 1 2 3
23. The extent of expert experience sharing in reducing the effect of human impact to plant & soil conservation on hill slope is 1 2 3
24. The trend extent of human acceptance to expert advice in reducing the effect of human impact to plant & soil conservation on hill slope is 1 2 3
25. The extent of expert capacity building (grade up) to reduce the effect of human impact to plant & soil conservation on hill slope is 1 2 3
26. The extent of all stalk holder motivation to reduce the effect of human impact to plant & soil conservation on hill slope is 1 2 3
27. The extent of free grazer animal number is 1 2 3
28. The trend of using free grazing animal is 1 2 3
29. The impact of free grazing animal to plant and soil conservation on hill slope is 1 2 3
30. The effect of free grazing animal to plant & soil conservation n hill slope is 1 2 3
31. The interest of human to reduce the number of grazing animal is 1 2 3
32. The extent of human proper handling to grazing animals is 1 2 3
33. The effort of human in reducing free grazing is 1 2 3
34. The extent of expert support & follow up in reducing the effect of free grazing animal impact to plant & soil conservation on hill slope is 1 2 3
35. The trend of human in using the plant for fire wood is 1 2 3
36. The trend of human in cutting tree for construction material is 1 2 3
37. The trend of human in cutting tree for charcoal production is 1 2 3
38. The trend of human in cutting tree for traditional practice such as smoke evil removing & brush is 1 2 3
39. The extent of soil erosion on hill slope is 1 2 3
40. The extent of human practice to reduce soil erosion on hill slope is 1 2 3
41. The extent of expert support & follow up in reducing soil erosion on hill slope is 1 2 3
42. The trend of expert experience sharing in reducing soil erosion on hill slope is 1 2 3
43. The extent of all stack holder cooperation in reducing soil erosion on hill slope is 1 2 3
44. The trend of human balance in (sustainable) use of plant & soil resource is 1 2 3
45. The extent of all stakeholder cooperation in using plant & soil resource of hill slope in a sustainable manner is 1 2 3

Dear respondents please write short answer for the following questions.

46. What is /are socioeconomic aspect of the people?
47. What is/are the human impact on plant & soil conservation on hill slope?
48. What is /are the effect of human impact on plant & soil conservation on hill slope?
49. What are the mechanisms to reduce the effect of human impact on plant & soil conservation on hill slope?
50. What expect from all stakeholders to undergo planting young trees, terrace as well as support and following of hill slope?

APPENDIX B

Data collecting check list

Data collected through document analysis, observation and interview in the site of Addis Alem, Midre Genet and Felege Hiwet kebele.

A. Data collected through observation:

1. What is/are the negative human impact on plant and soil conservation on hill slope?
2. What is/are the effect of negative human impact on plant and soil conservation on hill slope?

B. Data collected through interview of agricultural expert

1. What are the negative human impacts on plant and soil conservation on hill slope?
2. What is/are the effect of negative human impact on plant and soil conservation on hill slope?
3. What expect to be done to reduce the negative effect of human impact on plant and soil conservation on hill slope?

C. Data collected through document analysis

1. The number of male farmers that could participate in plant and soil conservation on hill slope?
2. The number of female farmers that could participate in plan and soil conservation on hill slope?
3. The number of domestic animals that obtain their feed grazing and browsing?

Cattle Horse
Sheep Mule
Goat Donkey

APPENDIX C

በአርሶ አደር አንዲምላ የተዘጋጀ መጠይቅ

በቅድሚያ ለምታደርጉልኝ ትብብር እያመሰገንኩ፡

I.ከመጠይቁ ፊተ ለፊት የተዘረዘሩ የአማራጭቁጥሮች ትክክለኛ (ከመጠይቁ ይስማማል የምትሉትን አማራጭ)ቁጥር እንድታክቡበትህትና አጠይቃለሁ፡ ፡

አባሪ (መግለጫ) 1. ዝቅተኛ 2. መካከለኛ 3. ከፍተኛ

1. የሰውልጅ ስለችግኝ ተከላ ያለውግንዛቤ 1 2 3
2. የሰውልጅ ለችግኝ ጥበቃና እንክብካቤ የምያደርገውጥረት 1 2 3
3. የሰውልጅ በእርከን ስራ የሚያደርገውተሳትፎ 1 2 3
4. የሰውልጅ በተዳፋት መሬቶች ለተሰሩ እርከኖች የሚደረገውጥበቃና እንክብካቤ 1 2 3
5. የሰውልጅ በተዳፋት መሬቶች ለሚደረገውየእፅዋትና አፈር ጥበቃ ያለውግንዛቤ 1 2 3
6. የሰውልጅ በተዳፋት መሬቶች ለሚደረገውየእፅዋትና አፈር ጥበቃ ያለውልምድ (ሂደት) 1 2 3
7. የሰውልጅ በተዳፋት መሬቶች ለሚሰሩ የእፅዋትና አፈር ጥበቃየኔባይነቱ 1 2 3
8. የሰውልጅ በተዳፋት መሬቶች ለሚሰሩ የእፅዋትና አፈር ጥበቃያለውትብብር 1 2 3
9. የሰውልጅ በተዳፋት መሬቶች የሚገኙእፅዋትና አፈር ተፈጥሮሃብቶች ለቀጣይ ትውልድየማሰብ ሁኔታ 1 2 3
10. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃየሚያደርሰውተፅኖ 1 2 3
11. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ሚፈጠረውአሉታዊ ውጤት 1 2 3
12. በተዳፋት መሬቶች ለሚደረገውየእፅዋትና አፈር ጥበቃየሰውልጅአቀባበሉ ምን ያክልነው 1 2 3
13. የሰውልጅ በተዳፋት መሬቶች የሚያደርገውሊቅየእንስሳት ግጦሽ 1 2 3
14. የሰውልጅ በተዳፋት መሬቶች ከሚገኙእፅዋት ተጠቃሚነቱ ምን ያክልነው 1 2 3
15. የሰውልጅ በተዳፋት መሬቶች ከሚደረገውየእፅዋት ጥበቃተጠቃሚስለመሆኑ ያለውግንዛቤ 1 2 3
16. የሰውልጅ አግባብነት ያለውየተዳፋት መሬቶች አጠቃቀም ልምዱ (ሂደቱ)
17. የሰውልጅ በአካባቢው በሚገኙተዳፋት መሬቶች ጥርጊያና ሌሎች ግንባታዎች ሲሠሩ ለእፅዋትና አፈር ጥበቃ ቅድመግንዛቤ የመስጠቱ ሁኔታ 1 2 3
18. የሰውልጅ በተደፋት መሬቶች በሚሰሩት ጥርግያዎችና ሌሎች ግንባታዎች ምክንያት የሚያደርሰውተፅኖ 1 2 3
19. የሰውልጆች በተዳፋት መሬቶች በሚሰሩት ጥርጊያዎችና ሌሎች ግንባታዎች በሚያደርሱት ተፅኖ ምክንያት የሚፈጠረውአሉታዊ ውጤት 1 2 3
20. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃለሚያደርሰውተፅኖ የባለሙያ ግንዛቤ 1 2 3
21. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት የባለሙያ ግንዛቤ 1 2 3
22. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት ለመቀነስ የባለሙያ ድጋፍና ክትትል 1 2 3
23. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት ለመቀነስ ባለሙያውተመከሮ የመውሰድልምዱ 1 2 3
24. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት ለመቀነስ የባለሙያ ምክር የመቀበልልምዱ 1 2 3
25. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት ለመቀነስ ባለሙያውአቅሙ የማሣደግልምዱ /ሂደቱ/ 1 2 3
26. የሠውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት ለሚፈጠረውአሉታዊ ውጤት ለመቀነስ ከባለድርሻ አካላት የሚደረግ ማበረታቻ 1 2 3
27. በተዳፋት መሬቶች በልቅ ግጦሽ ምግባቸውየሚገኙእንስሳት 1 2 3
28. የሰውልጅ በተዳፋት መሬቶች ልቅ የእንስሳት ግጦሽ የመጠቀምልምዱ 1 2 3
29. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋት አፈር ጥበቃበልቅ የእንስሳት ግጦሽ ምክንያት የሚደረገውተፅኖ 12 3
30. የሰው ልጅ በተዳፋት መሬቶች በሚደረገውበእፅዋትና አፈር ጥበቃ ልቅ የእንስሳት ግጦሽ በሚያደርሰው ተፅኖ ምክንያት የሚፈጠረው አሉታዊ ውጤት 1 2 3
31. የሰውልጅ በግጦሽ ምግባቸውየሚገኙእንስሳት መጠን ለመቀነስ ያለውፍላጎት 1 2 3
32. የሰውልጅ በግጦሽ ምግባቸውየሚገኙእንስሳት ያለውአያያዝ /አጠቃቀም/ 1 2 3
33. የሰውልጅ ልቅ የእንስሳት ግጣሽ ለመቀነስ ያለውጥረት 1 2 3
34. የሰውልጅ በተዳፋት መሬቶች በሚደረገው የእፅዋትና አፈር ጥበቃ በልቅ ግጦሽ ተፅኖ ምክንያት የሚፈጠረውን አሉታዊ ውጤት ለመቀነስ የባለሙያ ድጋፍና ክትትል 1 2 3
35. የሰውልጅ በተዳፋት መሬቶች የሚገኙእፅዋት ለማገዶ የመጠቀምልምዱ 1 2 3
36. የሰውልጅ በተዳፋት መሬቶች የሚገኙእፅዋት ለህንፃ ግንባታ የመጠቀምልምዱ 1 2 3
37. የሰውልጅ በተዳፋት መሬቶች የሚገኙእፅዋት ለከሰል ምርት የመጠቀምልምዱ 1 2 3
38. የሰውልጅ በተዳፋት መሬቶች የሚገኙእፅዋት (ለሜኒ ፣ መፋቅያና ሌሎች ልማዳዊ ድርጊት) የመጠቀምልምዱ 1 2 3
39. በተዳፋት መሬቶች የሚደርሰውየአፈር መሸርሸር 1 2 3
40. የሰውልጅ በተዳፋት መሬቶችን የሚደርሰውየአፈር መሸርሸርን ለመቀነስ የማያደርገውእንቅስቃሴ 1 2 3
41. በተዳፋት መሬቶች የሚደርሰውን የአፈር መሸርሸርን ለመቀነስ የባለሙያ ድጋፍና ክትትል 1 2 3
42. በተዳፋት መሬቶች የሚደርሰውን የአፈር መሸርሸርን ለመቀነስ ባለሙያውተመከሮ የመውሰድልምዱ 1 2 3
43. በተዳፋት መሬቶች የሚደርሰውን የአፈር መሸርሸርን ለመቀነስ የባለድርሻ አካላት ትብብር 1 2 3
44. የሰውልጅ በተዳፋት መሬቶት የሚገኙየእፅዋት እና አፈር የመሰሉ ተፈጥሮሃብቶች ሚዛናዊ በሆነ አግባብ የመጠቀምልምዱ 1 2 3
45. በተዳፋት መሬቶች የሚገኙ የእፅዋትና አፈር የመሰሉ ተፈጥሮሃብቶች የሰውልጅ ሚዛናዊ በሆነ አግባብ እንዲጠቅማቸው የባለ ድርሻ አካላት ትብብር 1 2 3

II.ከዚህ በታች ለተሰጡመጠይቆች አጠር ያለ ማብራሪያ እንዲሰጡበትህትና እንጠይቃለሁ

46. የአካባቢውሰውኑሮ በምን የተመሰረተነው?
47. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃየማያደርሰውተፅኖ ምን ምን ናቸው?
48. የሰውልጅ በተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚያደርሰውተፅኖ ምክንያት የሚጠሩ አሉታዊ ውጤቶች ዘርዝር
49. የሰውልጅ በአካባቢው በሚገኙተዳፋት መሬቶች በሚደረገውየእፅዋትና አፈር ጥበቃበሚደርሰውተፅኖ ምክንያት የሚፈጠረውአሉታዊ ውጤት ለመቀነስ ምን መሰራት አለበት?
50. በተዳፋት መሬቶች ችግኝ ተከላ ፣ እርከን ስራ እንዲሁም እንክብካቤ እንዲኖር ከባለድርሻ አካላት ምን ይጠበቃል?

1/1/2017