
Wolkite University

*We Strive for Wisdom!*

**COOLEGE OF AGRICULTURE AND NATURAL RESOURCE**

**DEPARTMENTOF NATURAL RESOURCE MANAGEMENT**

SENIOR RESEARCH ON:

# ASSESMENT OF FARMERS PERCEPTION TOWARDS SOIL EROSION AND INTRODUCE CONSERVATION TECHNOLGY

BY:

| NAME | ID NO. |
|---|---|
| 1. ESKEDAR YALEW | AGR /048/10 |
| 2. SEBSIBE MEGERSA | AGR/102/10 |
| 3. YOHANNES GEBRE | AGR/140/10 |
| 4. DARSEBO DOLSKO | AGR/038/10 |
| 5. MASRESHA YISMA | AGR/077/10 |
| 6. HUSSEN JEMAL | AGR/057/10 |

APRIL 20200

WOLKITE UNIVERSITY

## ACKNOWLEDGEMENTS

First of all, we would like to thanks Teacher for giving strength and potential and finished this paper .Next, we would want thanks our advisor Dereje Dejene who advise our continually followed guideline and available correction on time.

## ABBREVIATIONS

SWC - Soil and water Conservation

DA - Development Agent

**TABLE OF CONTENT**

# LIST OF TABLES

## ABSTRACT

The study area is found in SNNPR in Gurage zone south sodo wreda in Goggeti 2 Kebele The major assessing Farmer perception towards soil erosion and control measure and to identify their effects with Farmers efforts to control soil erosion. Soil erosion is one of the major causes of land degradation that causes low agricultural productivity in Ethiopia. Though, it is a natural process, its rate has increased significantly mainly by human activity. The study was conducted in South sodo wereda, in southern Ethiopia to assess perception of farmers on soil erosion and conservation practices. In this study, both primary and secondary data collection techniques were used. These include interviews, focus group discussions, field observations, and questionnaires were the source of this research. The sampling technique employed in this study were stratified, purposive and simple random were applied to select sample kebele and representative households heads. A sample of 150 heads of households was used to gain insight into soil erosion perceived by farmers and conservation practices in the study area. The finding of the study shows that almost all farmers of the study area had good perception on the causes, indicators and problems of soil erosion. The main causes of soil erosion perceived by farmers in the study area were high intensity of rainfall, continuous cultivation, topography and inappropriate soil conservation practices. The major soil conservation methods implemented by farmers in the study area were terracing, diversion ditches, and contour plowing and cut of drain. This research finding also concludes that the main constraints to apply soil conservations in South sodo wereda were mainly related to socioeconomic and biophysical factors such as uncontrolled (free) grazing, distance between homestead and farm land and farmers' low level of the economic capacity.

# 1. INTRODUCTION

The problem of soil erosion in Ethiopia is well known. Increased pressure on land use of the hill slopes the highlands of Ethiopia have been carried out on the causes of soil erosion and technical remedial actions have been proposed (Gizaw et al., 2009; Abiy et al., 2015). Soil erosion in association with inappropriate land management practices is one of the main factors causing land degradation. Poor land and water management practices and lack of effective planning and implementation approaches for soil conservation are responsible for strong environmental impact and major economic losses from decreased agricultural production and from off-site effects on infrastructures and water quality by sedimentation process (Yihenew et al., 2012; Pravat et al., 2015).

Soil erosion creates several limitations to sustainable agricultural land use as it reduces on farm soil productivity and cause food insecurity (Tegegne, 2014; Simeneh, 2015). To address this problem, considerable efforts have been made since that time to rehabilitate degraded environments and stop further degradation by the government of Ethiopia (Amsalu and Garf, 2004). By this action huge areas were covered with terraces and millions of trees were planted (Gizaw et al., 2009; Yeshambel, 2013; Tegegne, 2014).

Various soil conservation practices applied by farmers on their own farm plots are critical components of natural resource management when the aim is to achieve sustainable agricultural acceptable ecosystem integrity (Tegegne, 2014; Tesfaye and Kasahun, 2015). Soil erosion problem is also common in the country associated with topography and other determinate factors. Hence, the rate of severity varies from Kebele to Kebele topography of the land, inadequate soil water conservation practice and land use problem is the main prioritized one which accelerates soil erosion. Additionally, farmers frequently reject newly introduced soil water conservation practices even when they are aware of the fact that measure protects and

improves productivity of the lands. Therefore, assessing the factors which affect the attitude of the farmers towards soil water conservation.

## 1.1 Statement of the problem

There are significant problem that were observed in the kebele as a result of lack farmers attitude towards soil and water conservation practices such as in adequate soil and water conservation practice ,indicators of serious soil erosion ,and decrease in productivity of the land.

## 1.2 General objective

The general objective this study was to identify factors affecting farmer's perception to make decision on soil and water conservation practices on their farm land.

## 1.3 Specific objectives

- To evaluate local farmers perception of soil and water conservation practices.
- To assess the impact of incentive for adoption of SWC measure.

## 1.4 Significance of study

The result of this study was certainly being important both for Farmers and the government. On this, helps farmers to identify the area of the problem and to minimize it, enables the farmers to understand the problem of SWC and to discuss on it, helps the farmers to know the factors that affect their perception towards SWC and enables the expert to know the attitude of the farmers towards SWC practice

# 2. LITERATURE REVIEW

The severity of erosion is one of the major factors which call for various efforts to reduce unsustainable agricultural productivity. But the efforts were fails because of some factors like need of incentives, technology that needs too much labor, reduction of farm size and lack of awareness. The main purpose of this research was to determine the factors affecting farmer's perception to make decision on soil and water conservation practices on their farm land. The study was focused on the determinant factors which affect the decision of farmers to adopt soil and water conservation practices in their local conditions. Majority of the farmers have awareness about the introduced soil and water conservation (SWC).

## 2.1 Cause of soil erosion

Soil erosion occurs throughout the world .it is a common serious problem in dry land area. Soil erosion disturb agricultural, environmental and ecological function performed by the soil and result in the depletion, decrease moisture capacity and consequently in decreased crop productivity.in addition it also increased environmental pollution through the transport of chemicals and higher amount of nutrient , increasing the sediment in the stream and river and disturb the aquatic life. the major cause soil are rapid grows of population , sever soil loss deforestation ,low vegetative cover ,unbalanced crop and livestock production and negative coping strategies such as burning of animal dung and extensive use of cultivation on steep slope ,over grazing.

Lack of conservation structure; Steep land without conservation structure; damaged conservation structure Lack of diversion ditch, over grazing. In the long term soil erosion affects socio economic condition the society by causing flood, silting of water reservoir and disruption of communication .all the time selection soil and water conservation structure and design was focused on the slope, climate, soil characteristics, availability of labour force and construction material.

# 3. MATERIALS AND METHODS

## 3.1 Description of the study area

The study was conducted during the month of January to April 2014 in the Goggeti 2 Kebele Farmes group . Kebele is located at 107 km from Addis Ababa capital city of Ethiopia. The elevation ranges between 1800 and 1950 m.a.s.l. The climate with rainfall ranges from 1000 to 1500 mm with temperature minimum 15 to maximum 22, the dominant soil types of the Kebele is 35% Vertisols and 65% clay soil (Kebele Extension Worker Data, unpublished). Agriculture of the area is in rain fed with a subsistence mixed farming system. The major crops grown in Kebele are maize, wheat, barley, bean, pea, teff. The total area of the Kebele is 800 hectare. There are two zones identified by the Kebele based on the sub watershed, named as Zone I Meki and Zone II Lebu. The total numbers of household are 505, of which 56 are women, 449 are male headed household and it has 2494 people of which 1272 are women and 1222 are male in the Kebele. The major edible food is locally named as “Injera and Dabo (Kebele Extension Worker, unpublished).

## 3.2 Data source and analysis

The data required for the study was generated through formal house hold survey and interviewed with individual farmers and extension workers called development agent (DA), working in the Kebele. The assessment was undertaken between May to December 2015. For the interviewed household survey sample of 36 farmers households from three zones of Kebele were randomly selected and interviewed, of which 16 were female headed. The stratification of sample was depending on the level of farmer’s willingness to adopt the introduced SWC technologies. Fast, medium and laggard adopters were taken into consideration. The lists of these farmers were availed by the Kebele (DA), administration of the Kebele and elder group of the three zones. From the interviewed farmers, 51% were those who adopt the introduced soil and water conservation structure on their farm lands. The survey questionnaires comprised both closed and open.

### 3.3 Data source and analysis

The data required for the study was generated through formal house hold survey and interviewed with individual farmers and extension workers called development agent (DA), working in the Kebele. The assessment was undertaken between Januarys to April 2015. For the interviewed household survey sample of 56 farmers households from two zones of Kebele were randomly selected and interviewed, of which 16 were female headed. The stratification of sample was depending on the level of farmer's willingness to adopt the introduced SWC technologies. Fast, medium and laggard adopters were taken into consideration. The lists of these farmers were availed by the Kebele (DA), administration of the Kebele and elder group of the two zones. From the interviewed farmers, 51% were those who adopt the introduced soil and water conservation structure on their farm lands.

The survey questionnaires comprised both closed and open ended types of questions. The questionnaires generated information on the extent of farmer acceptance and adoption of the introduced conservation technologies. In reference to their awareness and perception of erosion hazards, labor supply, effectiveness of the technology in controlling soil erosion and improving land productivity, land tenure system and others. Each respondent was informed about the purpose of survey before starting the interview. Thus, they have developed trust to answer the question. Documentary materials available with the DA were also consulted to obtain information on types of the SWC technologies under implementation. Descriptive analysis has been employed in the analysis. Finally, the data generated by the questionnaires were presented by using percentage.

# 4. RESULTS AND DISCUSSION

## 4.1 Household farm characteristics

The total households in Goggeti 2 Kebele were 505 of which 449 were headed by males and 56 by females. The total population of these household were 2494 people and 1272 are women and 1222 are male in the Kebele. The average family size is five persons. The average age of sampled farmer was 48 with a minimum age of 33 and maximum of 63 of the total respondents (75%) were females. Half of the respondents (25%) were illiterates, while the rest are reading and writing through basic education and religious schools. All of the interviewed farmers owned land. The mean holding farm size is about 1.5 ha. The significances variation in the size of land holding among sampled households.

The majority of farmer (47%) possessed less than 2 ha of lands where 36% have more than 3.5 ha. During interview, the respondents reported that one household possessed up to six plots of farm lands within the small total farm size or cropland which were rented especially for temporary cultivated without any conservation structures except some traditional ditches. As farmers said, their lands were fast losing their productivity due to lack of attention given by the owner or the one who rent the land. In rainy season (kiremt), the livestock was dependent on

**Table 1 Characteristic of total households and their livestock in the three zones**

| Characteristics | Kebele | | |
|---|---|---|---|
| | Zone 1 | Zone 2 | total |
| Total household | 355 | 150 | 505 |
| Family size | 1500 | 949 | 2449 |
| Sample house hold | 90 | 60 | 150 |
| | | | |

**Table 2 Characteristic of total households and their livestock in the two zones.**

| Farmer | Option | Percentage |
|---|---|---|
| Cause of soil erosion | Lack of conservation structure | 25 |
| | Steep land with- out conservation structure | 15 |
| | Damaged conservation structure | 45 |
| | Lack of diversion ditch | 5 |
| | other | 10 |

**Table 3 Farmer's conservation practice in Goggeti 2kebele.**

| Management option | percentage |
|---|---|
| Contour plughing | 5 |
| Cultural ditch | 15 |
| Soil bund | 55 |
| Stone bund | 5 |
| Water way | 20 |

## 4.2 Farmer's conservation practice in Goggeti 2 Kebele

All the respondents answered that soil and water conservation measures were very helpful for erosion control and better to improve soil productivity. Farmers used terraces, cultural drainage ditch, soil bund, water way and others to control their farm land from erosion. Traditional ditches were indigenously practiced by 33% of the interviewed farmers for control soil erosion. It is used to drain out excess water from their cultivated lands. The farmers also believed that these ditches were effective especially one cropping season to conserve soil against erosion. They emphasized that "ditches" needless labor, low cost and short time construction as compared to other conservation structure. However, they concluded that ditches have little importance for sustainable land management as compared to other improved soil water conservation technologies. This shows that farmers have a good knowledge's about introduced SWC technologies. Gizaw et al. (2009), also emphasized similar results that is important for

effectiveness to implement SWC measure depends upon knowledge and information of farmers. From interviewed farmer, soil bund and stone bund were practiced by 51% for mean of conservation. However, from field observation bund were poorly maintenance specially those who rented land from land holder, farmers does not give attention for maintenance of already constructed bunds due to need of immediate return and they believe that bunds can decrease their farm size. Even long term returns of soil bund were other problems for adopting SWC technologies.

### 4.3 Causes of soil erosion, soil fertility and productivity decline

The major causes of soil erosion in the area mentioned by farmers were steep slope, without conservation structures, lack of conservation structure, damaged conservation structure and others like deforestation, free grazing and lack of income to construct SWC structure. Minor of the farmer said that lack of diversion ditch also contributed to the cause of soil erosion. The cause of soil erosion of their farm land was lack of conservation structure. Damaged conservation structure was also other major cause of soil erosion. Additionally, other reasons gave little contribution for soil erosion and fertility decline was lack of diversion ditch, cultivating steep land without conservation structure. As reported by Adimassu (2017) most farmers believed that, productivity and their land declined because of soil erosion. Soil erosion was the main cause of fertility decline. On the other hand, repeated cultivation had its own effects on fertility and productivity decline. No respondents said that rainfall shortage is a problem Ingeneral; almost all the respondents have a good knowledge of the cause of soil erosion, fertility and productivity decline.

### 4.3 Farmer's conservation practice

Soil and water conservation measures were very helpful for erosion control and better to improve soil productivity. Farmers used terraces, cultural drainage ditch, soil bund, water way and others to control their farm land from erosion.

The farmers also believed that these ditches were effective especially one cropping season to conserve soil against erosion. They emphasized that “ditches” needless labor, low cost and short time construction as compared to other conservation structure. However, they concluded that ditches have little importance for sustainable land management as compared to other improved soil water conservation technologies. This shows that farmers have a good knowledge’s about introduced SWC technologies. Gizaw et al. (2009), also emphasized similar results that is important for effectiveness to implement SWC measure depends upon knowledge and information of farmers.However, from field observation bund were poorly maintenance specially those who rented land from land holder, farmers does not give attention for maintenance of already constructed bunds due to need of immediate return and they believe that bunds can decrease their farm size. Even long term returns of soil bund were other problems for adopting SWC technologies.

### 4.4 Farmer’s perception, acceptance and Introduction of SWC measures

Since the 1990, implementation of soil and water conservation measured has been taken as part of agricultural extension package of the present government (Bewket, 2003). However, the practice has largely delivery oriented in which the farmer forces to the implemented conservation measures designed for them by technical expert (Simeneh, 2015). the new soil and water conservation technologies have the potential to improve land productivity. They had already observed a better growth and development of crops particularly along the structures felt sediments were trapped. They also evaluated that if that conservation structure were not built, during data collection, participant who treated their land by some conservation structures gave wittiness for us that technology have improved their land productivity. The farmers were interviewed also what their intensions were regarded using the introduced soil and water conservation technology in the future . soil and water conservation technologies in the rest of their farm fields (pilots that were not treated by that time); most of the respondents expressed that they had plan to implement SWC measures. However, they intentionally need availability of incentive to implement SWC measures in their land. According to Mebrahten (2014) and Simeneh (2015), the use of incentives in promoting adoption of soil and water conservation

measures under the condition of the Ethiopia high land was necessary. Farmers are unlikely to expect that the introduction of new conservations measures will improve their immediate well beings. They suggested the use of incentives such as food for work and creditors' fertilizers are interring linkage mechanism and adopting soil and water conservation measures. Similarly, the assessed result indicates their attitude towards support need from government or other body, they were asked whether they should be paid for constructing and maintaining soil and water conservation structure in their farm

## 4.5 Factors affecting farm level adoption of the SWC technologies

The following section presents details of some factors that influence the farmer's decision with regards to utilization of the technologies as part of their regular land use and agricultural production activities.

### 4.5.1 Perception of erosion as a problem

Perception of soil erosion as a hazard soil productivity and sustainable agriculture was the most important determinant of effort of conservation measures. On the other hand, when farmers do not accept soil erosion as a problem, they cannot expect benefits from controlling the erosion process and it is highly that they will be by the side against adopting any conservation technologies soil erosion as a problem on their on farm that constraining soil productivity. The most important top soil for crop production activity is deteriorating over time due to erosion processes. Hence, they observed frequently how they lose soil from cultivated fields has been reducing the depth of the top soil throughout the time. Moreover, soil depth decrease or the unproductive soil (stone which is very compacted) will be left.

The majority of the occurrence of rill erosion is dominant erosion feature for all on their farm lands. While gully and sheet erosion is moderate. From all farmers, almost half of the farmers

rated the extent of the problem as sever and the rate of soil erosion has been increasing over the time while small number of farmers believed that the extents of erosion were minor. Almost all farmers answered that erosion can be controlled while very small number of farmers believed that erosion was not controlled totally, but it can decrease some degree of its severity.

**Table 4 Indicators of acceptance and adoption of SWC technologies.**

| Farmers response to | option | Yes(%) | No (%) |
|---|---|---|---|
| Indicator of acceptance | Their knowledge of SWC measure | 100 | - |
| | Effectiveness of SWC arresting soil erosion | 100 | - |
| | SWC has a potential to improve land productivity | 100 | - |
| Indicator of adoption | Plan to implement the new SWC technique | 80 | 20 |
| | Plan to maintain the constructed structure | 60 | 40 |
| | Farmer should be paid for constructing and maintain SWC in their farm | 60 | 40 |

**Table 5 Farmer's perception of respondents for soil erosion as a problem.**

| Farmer response to | Option | Percentage |
|---|---|---|
| Occurrence soil erosion | Yes | 100 |
| | No | 0 |
| Prevailing form of erosion | Sheet erosion | 5 |
| | Rill erosion | 80 |
| | Gully erosion | 15 |
| Extent of soil erosion(the degree of the extent damage) | Sevier | 45 |
| | Moderate | 50 |
| | minor | 5 |
| The rate of erosion over time | Increasing | 53 |
| | Same | 0 |
| | Decreasing | 47 |
| Can soil erosion can be controlled | Yes | 85 |
| | No | 15 |

**Table 6 Farmers reasons for not adopting the newly introduces SWC measures.**

| Option | Percentage |
|---|---|
| Require too much labour | 34 |
| Land insecurity | 4 |
| Decrease farm size and difficult to plough | 32 |
| Lack of knowledge | 25 |
| Not considering erosion as a problem | 0 |
| Other (lack of income age family size | 5 |

## 5. CONCLUSION AND RECOMMENDATION

Generally it was concluded that soil and water conservation were not sufficiently implemented as compared to erosion hazards of Kebele. The conservation undertaken in Kebele does not fairly distributed to the Kebele equally. The effectiveness in controlling depends on perception of farmers rather than using other different approaches to accept farmers. Even though, the farmers of Kebele have a good perception, they consider the structure can consume more land and need labor. The farmer suggested the use of incentives such as food for work and creditors' fertilizers are interring linkage mechanism and adopting soil and water conservation measures. Almost all the farmers have a good perception about erosion hazards, but their willingness to adopt SWC measures depend intentionally on incentives. Almost half of the farmers within the Kebele also practice the local diversion ditch as a means of conservation measures which is believed to be simple, not need too much labor, do not decrease farm size. Land tenure affects farmer's perception to adopt SWC technology. Based on the research, the following future lines of work are forwarded:

(1) Fairly distribution of technical support, training and application of improved SWC technology is necessary across three zones. (2) Real farmers participatory approach necessary in planning and implementing of SWC to increase their preferences for adopting SWC technology. (3) Avoiding dependences on incentives by cooperating farmers to implement SWC technology. (4) Improving market accessibility and exporting potential for local products. (5) Maintaining and stabilizing constructed SWC technology continuously. (6) Training should be taken until farmers show willingness/adopt the technology. (7) Facilitate zero grazing

## 6. REFERENCES


Abiy G, Getahun Y, Genene M (2015). Assessment of farmers' perception and adaptation mechanism to soil erosion problem in ShombaKichib,Gimbo District, Kaffa Zone, South West Ethiopia.

Adimassu Z, Langan S, Johnston R, Mekuria W, Amede T (2016). Impacts of Soil and Water Conservation Practices on Crop Yield, Run-off, Soil Loss and Nutrient Loss in Ethiopia.

AmsaluA ,Graf J (2004). Farmers views of the soil erosion problem and their conservation knowledge at Beressa watershed, central high land of Ethiopia. 23: 99-108.

Bewket W (2003). Household level tree planting and its implications for environmental management in the northwestern highlands of Ethiopia: a case study in the Chemoga watershed, Blue Nile basin. Land Degradation Dev. 14(4):377-388.

BiratuAA ,Asmamaw DK (2016). Farmers' perception of soil erosion and participation in soil and water conservation activities in the GushaTemela watershed, Arsi, Eth. Int. J. River Basin Manage. 14(3):329-336.

Gizaw DG, Andreas K, Hans H (2009). Assessment of soil erosion and soil conservation practices in Angereb watershed, Ethiopia: technological and land user context. University of Hamburg, October 6-8, 2009. Conference on International Research on Food Security, Natural Resource Management and Rural Development.

Mebrahten T A (2014). Farmers' perception of soil erosion and adoption of soil conservation measures in KollaTembienTabiaAwotbkalsi, Tigray regional state, Ethiopia. M.A. thesis.

PravatK ,Gouri SB, Ramkrishna M (2015). Farmers' perceptions of soil erosion and management strategies in south Bengal in India.Euro. J. Geo. 6(2):85-100. Rehema B S (2014). Factors influencing adoption of soil conservation measures, sustainability and socio-economic impacts among smallholder farmers in Mbeya rural district Tanzania. MSc dissertation.

Simeneh D. W (2015). Perception of Farmers toward Physical Soil and Water Conservation Structures in Wyebla Watershed, Northwest Eth. Acad. J. Plant Sci. 7(3):34-40

Tegegne TB (2014). Perception of farmers on soil erosion and conservation practices in Dejen District, Ethiopia. Int. J. Environ. Prot. Policy 2(6):224-229.

TesfayeG ,Kasahun K H (2015). Assessment on Farmers' Practices on Soil Erosion Control and Soil Fertility Improvement in Rift Valley Areas of East Shoa and West Arsi Zones of Oromia, Ethiopia". EC Agric. 2(4):391-400.

Yeshambel M (2013). Indigenous Knowledge Practices in Soil Conservation at Konso People, South western Eth. J. Agric. Environ. Sci. 2(2).

Yihenew G, Tadele A, Mitiku H, Charles Y (2012). Lessons from Upstream Soil Conservation Measures to Mitigate Soil Erosion and its Impact on Upstream and Downstream Users of the Nile River. CP 19 Project workshop Proceedings.