International Journal of Scientific Research in Civil Engineering
© 2021 | IJSRCE | Volume 5 | Issue 2 | ISSN : 2456-6667

Farmers Perception towards the extent of Land Degradation in the case of Essera Woreda, Dawuro Zone Southwest Ethiopia

Barena Adare
Jimma University, P.O.Box, 307, Jimma, Ethiopia
Corresponding Author e-mail : bare.abebu12@gmail.com

ABSTRACT

The aim of this study to assess farmer's perception towards the extent of land degradation in oki Keble. Specifically the study intended to analyze farmers' knowledge of land degradation and perceived impacts, to identify the traditional knowledge, techniques and practices used by households to control land degradation, to explore farmers' knowledge of the existing soil and water conservation measures and constraints to their adoption. The various data collection tools used for the collection of qualitative and quantitative information and this qualitative and quantitative information were analyzed by descriptive statistics such as percentage and table. The results of house hold survey indicate that farmers were aware of the on-going soil degradation and of several erosion control measure and land husbandry practices. They perceive soil degradation mainly, decreasing fertility, changing in appearance and becoming stony. The most frequently mentioned soil erosion indicators were rill and gully formation followed by exposed underground rocks, soil becoming coarse and stony, and topsoil removal. The most important perceived indicator of soil fertility loss was reduced crop yield, followed by poor crop performance and yellowing of the crop. Majority of farmers preferred soil bund, crop rotation and counter ploughing for soil and water conservation and chemical fertilizer, crop rotation and mixed cropping for soil fertility amendment while they did not recognize agro-forestry and farm yard manure as a conservation and fertility amendment measure. Farmers faced several constraints in adopting soil and water conservation measures: decrease in farm size, its inconvenience during for free movement of oxen plough, and multiplication of mistakes in the construction soil bunds.

Article Info
Volume 5, Issue 2
Page Number : 71-78

Publication Issue :
March-April-2021

Article History
Accepted : 01 April 2021
Published : 04 April 2021

Keywords : Land degradation, Conservation, Perception, Soil erosion

I. INTRODUCTION

Globally, about 80% of the current degradation of Agricultural land is caused by soil erosion (Angima et al., 2003). Erosion by water, at a global Scale, is the main soil degradation process in agricultural areas (Bewket and Sterk 2002). It generates strong environmental impacts and major economic losses from decreased agricultural Production and from off-site effects on infrastructure and water quality by sedimentation Processes (Zinabu et al., 2002; Daba, 2003; Haregeweyn et al., 2005), summarized the maximum annual rates of soil erosion in cultivated fields ranging from 200t/ha in China, to 30t/ha in Belgium. Soil erosion creates severe limitations to Sustainable agricultural land use, as it reduces on-farm soil productivity and causes food insecurity (Tadesse, 2001; Sonneveld, 2002; Moges and Holden, 2006).

In most developing countries, including Ethiopia, human Activity triggers these losses (Mohammad et al. 2001, Belyaev et al., 2004, Bewket and Sterk, 2005). This is associated with rapid population growth, inadequate attention to the basic natural resources (soils, water and vegetation), and the need to maximize production to meet the needs of the growing population (Shiferaw and Holden, 1999, 2000, Bewket, 2002). This situation is more serious in poor developing countries like Ethiopia (Feoli et al., 2002), where subsistence production predominates. The Ethiopian farmer, who on average cultivates one hectare of food crops and keeps some livestock, is nowadays dependent on natural conditions and cannot tolerate further deterioration of soil productivity (Sonneveld and Keyzer, 2003).

Land degradation is the major economic and environmental threat in Ethiopia. Since 1960s various traditional land management systems have undergone unprecedented changes. In Ethiopia about 90% of the country's total agricultural produce is generated from the highlands but the highlands of Ethiopia cover nearly 45 percent of the country. The Ethiopian highlands are the center of the economic activity of the country. Land degradation has attracted the attention of donors, researchers and policy-makers in Southeast Asia over the past two decades.(zinabu,et. al,2002).

At the same time, research has devoted much attention to developing soil Conservation and sustainable land management practice. Soil erosion is recognized as one of the world's most serious environmental problems (Pimentet.al, 1995, Shiferaw and Holden, 1999).

The farmers were virtually considered ignorant of soil and water conservation practices and were largely excluded from the planning, implementation, and evaluation of these conservation measures. Only rare attempts were made to include indigenous experience and knowledge (Amsalu, 2006). Awareness, perceptions and attitudes towards the problem of resources degradation is one of the many socioeconomic, cultural and psychological factors which are known to influence acceptance and adoption of conservation measures by farmers elsewhere (Baum and Wolff, 1993).

Land degradation is major environment and socio economic problem in Dawro zone, Esera woreda , particularly in oki kebele. Farmers stated that they are more worrying about the degradation because most parts of their grazing land, agricultural land and forest lands are affected by degradation. Most of these areas that the occurrence of erosion damages bringing great problem on land use system. Land degradation also has affected farming activities by farmer's fertile land and nutrients have been triggered by flooding, water erosion and chemical degradation which reduced the structure of the soil with in oki Keble. Farmers also expressed the opinion that the loss of soil and other natural resources from the fields reduced the depth of the topsoil and lead to a reduced production potential. Some parts of the area are affected by Rill erosion while other part is affected by

gully formation. Major factors in the area influencing farmers' land protection decision processes were: demanding much labor, decreasing farm size and difficult to plow and lack of technical support from agricultural experts, lack of relevant information to farmers from extension workers. In Dawro zone , Esera woreda , particularly in oki kebele, researcher conducted research regarding farmer's perception towards the extent of land degradation to fill this gap.

II. METHODS AND MATERIAL

Site description

The study was conducted in Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia in the Esera woreda of Dawro zone, southwestern Ethiopia .The district has 29 kebeles. The area is topographically rugged. The Woreda covers total area of 106021.26 hectares and lies between 6º38′00″-7º6′00″ degree north latitude and 36º38′00″ to 37º13′00″ degree east longitudes, with an elevation ranging 501-2500m. Regarding the Agro-Ecology, 47% was tropical, 32% was Subtropical and 21% was temperate. The annual mean temperature ranges between 15.1 to 27.5ºc. The rainfall was a bimodal type, the short rainy season was between (February to March) and the long between (May to September). The average annual rainfall ranges from 1201 to 1800mm. According to the land utilization data of the area, 38.4% is cultivated land, 13.39% grazing land, 16.81% forest bushes and shrub land, 17.09 % cultivable and 14.31 is covered by others. The livestock resource of the woreda was estimated to be 313,094 cattle, 113,554 sheep, 45,703 goats, 7,081 horses, 1,934 mules, 5,064 donkey, and 157,996 chicken and 28,557 traditional hives (CSA, 2006).

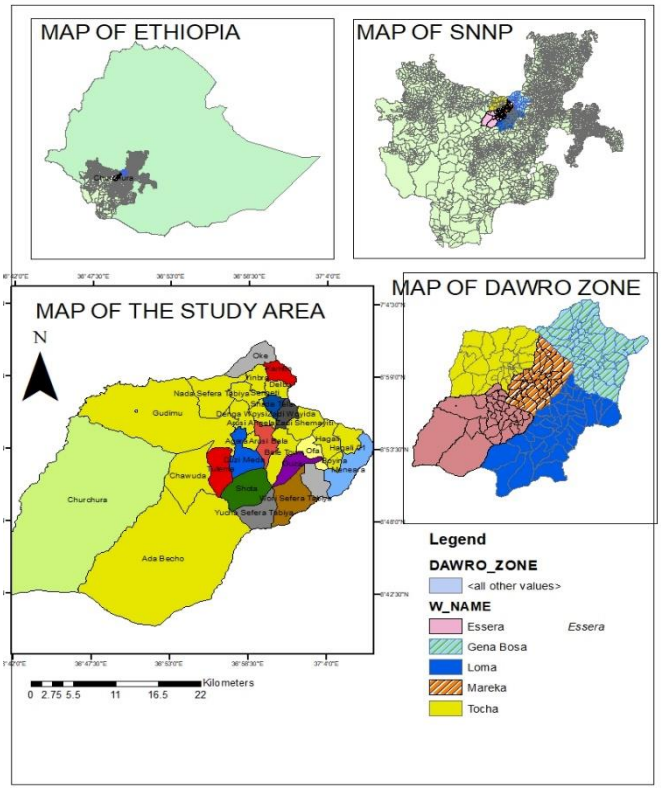

Fig 1. Map of the study area

Source Arc GIS

Research Method

Due to the nature of the problem, the mixed method research (quantitative and qualitative) was employed. In oki kebele there were 3500 farming households. Simple random sampling method was implemented. The reason why that we used simple random sampling is to reduces the potential for human bias in the selection of cases to be included in the sample and to limited missed data. For sample size determination, solvents 'formula was used.

Thus=N\1+ ($N*e^2$)

Where, n=sample size

N=Total population

e=is the level of precision

So, n=475/1+ (475*(0.1*0.1) =475/5.75=82 households

Method of data Collection

The data used for this study was obtained from both primary and secondary sources. The primary sources mainly related to adoption behavior were collected using both formal and informal survey methods. All

the necessary quantitative data required for the study was gathered through a farm household survey. Data generated from the interview included types of SWC measures (traditional and improved) adopted by the farmer, their extent and their effectiveness. Secondary data from literature (scientific and non-scientific reports and unpublished material, proceedings and statistical abstracts) and offices of Agriculture and Natural Resources at district level were used as additional sources of information. These data from informal local discussions and secondary sources was used to verify and supplement the quantitative results from the structured questionnaires.

Method of data Analysis

The study was generated by both qualitative and quantitative data. Information obtained from unstructured interviews and informal interviews with different elderly people in the village and extension officer would mostly in form of verbal/narrative information. The information obtains from households were analyzed and summarized using descriptive statistics such as table, percentage and frequency.

III. RESULTS AND DISCUSSION

Farmers' Perception toward land Degradation

This research revealed that farmers were aware of soil erosion processes, which they defined as carrying away of soil or removal of top-soil by water or loss of soil triggered by human Activities. Farmers' perceived reasons for continued soil erosion processes were listed and scored. Most farmers mentioned 24.39. % and 25.61% are deforestation and high rain fall as the major causes for soil erosion respectively. About 18.29% of the respondents suggest the causes of erosion were wrongly designed SWC Structures. Most farmers did not stated excessive tillage practices, poor soil cover are reasons for the on-going soil erosion. Around 10% of farmers also aware steep sloops are the one causes of erosion Farmers who have no enough knowledge deforest the forests which can increase erosion potential. The highest number of farmers reporting high rain fall and deforestation are perceived reason for soil erosion on their fields. This is in Line with what can be observed in the field. The linear erosion features such as rills and gullies are denser in oki Keble. Majority of farmers also reported that high rainfall caused gully and rill erosion, which are resulted high degradation of fertile land and grazing land. The evidence of the on-going soil erosion was demonstrated with identification of several onsite erosion reasons.

Table 1. Perceived reasons for continued soil erosion

Perceived reasons for continued soil erosion	Frequency	Percentage (%)
Deforestation	20	24.39
Poor soil cover	12	14.63
Excessive tillage	6	7.32
Wrong design	15	18.29
Steep slopes	8	9.76
High rainfall	21	25.61
Total	82	100

Source; field Survey, 2020

Traditional Soil Conservation Measures

The overwhelming majority of farmers in the study area reported practicing some type of soil conservation measures.

Table 2. Types of soil erosion control measures being practiced

Types of measures	Number of respondents	Percent (%)
Water diversion ditch	9	10.98
Ridges	5	6.1
Contour ploughing	11	13.41
Check dams	17	20.73
Terracing	6	10.98
Bunding	25	30.48
Stone bund	3	7.32
Total	82	100

Source; field Survey, 2020

The results indicate that (30.48 %), (20.73%) and(13.41%) of the respondents were the most widely used bunding ,check dams and contour plugging respectively as traditional soil and water conservation measures. A significant proportion of farmers constructed check dams to refill and prevent further development of rills and gullies near their farm boundaries. Farmers also stated Check dams; soil bund and contour plugging are relatively most effective for their soil fertility management and protect their land from degradation by reducing soil erosion. This could explain the high adoption rate. Studies from elsewhere have shown that these measures are short-term water management practices to fertility rather than ways of keeping soil in place. On the other hand as the results of this study do indicate that the contribution of stone bund terracing, diversion ditch, ridges to SWC was less recognized by farmers because lack of good advice from the extension workers as well as from agricultural office of the Keble.

Soil Fertility improvement Methods

Most farmers were taken various measures to improve soil fertility in the study area. This could explain the perception that the effect of soil fertility loss is change in soil physical structure. It also demonstrated the great concern to achieve better yields. Some of the respondents (14.63%) were used inorganic fertilizer but majority of farmers uses farm yard manures to increase their soil fertility because many farmers engaged in livestock production and they use animal waste materials to increase their soil fertility.

Table3. Soil fertility measures being practiced

Practices	Number of household	Percent (%)
Use of farm yard manure	35	42.68
Use of inorganic fertilizer	12	14.63
Inter cropping	11	13.42
Cropping system	15	18.29
Use of compost and mulch	4	4.88
Crop residue	5	6.1
Total	82	100

Source; field Survey, 2020

Farm Yard Manure

43% of the respondents were used farm yard manure but only to maintain soil fertility of homestead gardens in study area. The major land use systems in the community Include homestead farms, where the most important crops such as maize, some coffee, teff, Beans and vegetables are grown.

Inorganic Fertilizer

12% of the respondents were used chemical fertilizer as the source of improving soil fertility in study area. Relatively very few farmers tended to use of compost and mulch instead of purely relying an inorganic fertilizers, as more common with the majority of farmers. Increased organic matter content would increase efficiency of inorganic fertilizers through increased water availability, reduced nutrient loss from leaching and increased microbial activity.

Cropping System

A common feature of the cropping systems in the study area is the widespread practice of crop rotation. Traditionally, the major cereals are grown in rotation with sorghum or maize. More than 18.29% of the respondents reported that they practiced crop rotation. But, a relatively high Proportion of farmers reported that they grow sorghum or maize in rotation with teff, wheat or barley. They perceived that soil fertility was improved when cereals were grown in rotation with sorghum or maize.

Intercropping

It emphasis on legumes is to enhance soil fertility, since inorganic fertilizer use has fallen drastically

because of the high prices. Under this system different crops are intercropped which include maize + potato, maize + cabbage. There are essentially two practical advantages of the Intercropping system for example mixing legumes with again crop especially maize. Firstly, Legumes are nitrogen fixing plants, therefore, by intercropping the two, farmers don't even have to apply fertilizer or reduce the amount since most of them cannot even afford to buy fertilizer. Lastly, legumes are a cover crop so they suppress the growth of weeds and minimize the difficult task of weeding

Compost and mulching practice

About 4.88% of respondent's uses compost and mulch to improve the soil structure, help keep plant roots cool and moist, conserve water maintain a porous surface help to prevent soil erosion. Farmers reported also organic mulching such as wood chips, grass clipping, leaves and straw to enhance their land to be more structured. Even though it is more appropriate way, most farmers do not use this practice in study area.

Major Uses of Crop Residue

The results indicated that use of crop residues for livestock feeding were common practices in the study area. Discussion with farmers and extension agent's revealed that crop residue from small cereals (wheat, barley and teff) and legumes are transported from the crop field to the home compound and stored for animal feed due to constant feed shortage. Mulching, covering soil surface with crop residues, are potential measure to reduce soil/nutrient loss. Through mulching, the hydraulic force of the raindrop on the soil particle will be reduced, there by soil detachment is minimized. However, mulch is less applicable in the study area farming systems because of less availability of crop residue.

Constraints to adoption of SWC measures

Farmers listed several constraints encountered when adopting SWC measures. Generally, the main constraints listed in the table were small farm size, Lack of Technology attributes, lack of awareness, Lack of enough extension workers and Property right. 32.93% of farmers reported that small farm size is the major constraints than others as stated in the table .this is because farmers have not enough labour to practice all soil and water conservation .in addition as result shows 24.39 %, 14.63%, 10.98% are another constraints due to lack of technology attributes, lack of awareness and lack of enough extension workers respectively in the study area. The extension workers do not visit to the farmer's community all the time in order to get those farmers enough awareness about soil and water conservations. About 14 % of farmers stated property is one of the constraints. Because in the study area, cropped areas remain 'private' only as long as the crop is on the farm. After harvesting, the areas revert to open access or common property that can be used as communal grazing land. This makes it difficult to maintain conservation measures, particularly physical and vegetative ones. Therefore the cause for the current low motivation to increase and maintain the number of SWC measures might be due to adoption constraints, listed in this study.

Table4 Observed constraints to adoption of SWC measures by farmers.

Adoption constraints	Number of house hold	Percent (%)
Small farm size	27	32.93
Lack of Technology attributes	20	24.39
Lack awareness	12	14.63
Lack of enough extension workers	9	10.98
Property right	14	17.07
Total	82	100

Source; house hold Survey, 2020

IV. CONCLUSION

Land degradation can be triggered by various processes that lower the potential productivity of land leading to long-term (sometimes irreversible) deterioration. Totally all the farmers cultivated all their land with no room for expansion except in marginal areas. Sloppy lands which used to be grazing areas or tree plots are not suitable for cultivation. . Farmers have good perception to understand the effects of erosion on their land. Farmer's also aware degradation of their land was due to erosion hazard caused by deforestation, poor soil cover, excessive tillage, high rain fall and steep slope. They attributed soil fertility levels and to slope position. Fields on flat and gentle slopes were perceived to have highest potential for soil fertility. Similarly, Farmers mentioned indicators that used to perceive and interpret land degradation identified by this study include reduction in soil fertility, change in soil physical structure, gully erosion formation, rill erosion and disappearance of grass and some local specific plant species. Some of biological as well as physical indicators, however, are local and site specific. Regarding of level of soil fertility improvement farmers in the study area practices fertility improvement mechanisms such as farm yard manure, inorganic fertilizer, inter cropping, crop rotation, compost, mulching and crop residue. However most farmers are not using mulching, compost and crop residue. Farmers also perceived that increased their fertility could be realized, among other husbandry practices, through implementation of SWC measures. In addition appropriate design of SWC measures were perceived to improve soil fertility, and soil-water retention. Apparently farmers were knowledgeable about various SWC measures but implemented a few of them. Bunding and counter plugging were the most popular and used traditional SWC practices. Even though farmers had knowledge of many types of SWC measures, constraints to ensure widespread adoption were still being experienced. The most important constraints to adopt SWC were small farm size, lack of technology attributes, awareness gap in farming community, lack of enough extension workers and property rights in the study area.

V. REFERENCES

[1]. Amsalu, A. (2006). Best practices in soil and water conservation in Beressa watershed, highlands of Ethiopia. Ph.D.thesis, Wageningen University, Netherlands.

[2]. Baum, E., and P. Wolff, ed. (1993). Acceptance of soil and water conservation: Strategies and technologies. Germany: DITSL.

[3]. Belyaev V., P.J. Wallbrink, V. Golosov, A.S. Murray and A. Sidorchuk, (2004). A comparison of Methods for evaluating soil redistribution in the severely eroded Stavropol region,Southern European Russia, Faculty of Geography, Moscow State University, Russia.

[4]. Bewket W., Sterk, G., (2002). Farmers' participation in soil and water conservation activities in Chemoga watershed, Blue Nile Basin, Ethiopia. Land Degrad.Dev. 13:189–200.

[5]. Daba S., (2003). An investigation of the physical and socioeconomic determinants of soil erosion In the hararghe highlands, eastern Ethiopia. Land Degrad.Develop. 14: 69 81.

[6]. Haregeweyn N., Jean Poesen,T, Jan Nyssena, Gert Verstraeten, Joris de Vente, Gerard Govers, Seppe Deckers, Jan Myerson's, (2005). Specific sediment yield in Tigray-Northern Ethiopia: Assessment and semi-quantitative modeling Geomorphology 69:315–331.

[7]. Moges A. and Holden N.M., (2006). Farmers' perceptions of soil erosion and soil fertility loss in Southern Ethiopia, land degradation & development.

[8]. Mohammad A. Jabbar, M.A. Mohamed Saleem and Hugo Li-Pun, (2001). Towards Trans

disciplinarily in technology and resource management research: a Project in Ethiopia. Outlook on Agriculture 30(4):257–260.

[9]. Shiferaw B., Holden, T.S., (2001). Farm-level benefits to investments for mitigating lan Degradation: empirical evidence from Ethiopia. Environ. Dev. Econ. 6:335–358.

[10]. Shiferaw B., Stein T. Holden, (2000). Policy instruments for sustainable land management: the case of highland smallholders in Ethiopia. Agricultural Economics 22: 217–232.

[11]. Sonneveld B.G.J.S., (2002). Land Under Pressure: The Impact of Water Erosion on Food Production in Ethiopia. Shaker Publishing, Maastricht, the Netherlands.

[12]. Tadesse, G., (2001). Land degradation: a challenge to Ethiopia. Environmental Management 27: 815–824.

[13]. Zinabu G. M., Elizabeth Kebede-West head&Zerihun Desta1, (2002). Long-term changes in Chemical features of waters of seven Ethiopian rift-valley lakes Hydrobiologia477:81–91

Cite this article as :

Barena Adare, "Farmers Perception towards the extent of Land Degradation in the case of Essera Woreda, Dawuro Zone Southwest Ethiopia", International Journal of Scientific Research in Civil Engineering (IJSRCE), ISSN : 2456-6667, Volume 5, Issue 2, pp.71-78, March-April.2021
URL : https://ijsrce.com/IJSRCE215217