PalArch's Journal of Archaeology of Egypt / Egyptology

# Assessing Community Participation on Soil Conservation and Its Influences on Poverty Reduction: The case of Bule Hora Woreda, West Guji Zone, Ethiopia

*Mr. Teshome Deresse Gizaw*

Lecturer, Department of Geography and Environmental Studies, College of Social Sciences and Humanities, Bule Hora University, Oromia Regional State, Ethiopia, Horn of Africa

Email: deresseteshome@gmail.com

**Mr. Teshome Deresse Gizaw: Assessing Community Participation on Soil Conservation and Its Influences on Poverty Reduction: The case of Bule Hora Woreda, West Guji Zone, Ethiopia -- Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(9). ISSN 1567-214x**

**Keywords: Community Participation, Conservation, Poverty, Soil Erosion**

## ABSTRACT

The causes of soil erosion are deforestation, overgrazing &over cultivation and land degradation. The foremost objective was to assessing community participation on the soil conservation, to identify the root cause of soil erosion and its influence on poverty reduction in study area. The data collected by questionnaire, interview and observation from 84 households selected using simple random sampling method for the reason having conscientious to conserve soil erosion. Secondary data obtained from published and unpublished materials. The major findings were augmentation of the majority of the household (68-95%) reported that practices soil conserving were very effective in improving productivity of household which directly ties with their livelihood was dramatically diminished the function of the ecosystem services specifically the provisioning services at the study area.

## 1. Introduction

### 1.1 Background

Much of the world has been facing ever more severe soil erosion of diverse degrees caused by both natural and human factors as well as its consequent environmental deterioration which influence directly the livelihood of household. Among this, soil erosion being one of the natural resource which is base for all the life existence is mostly depleted globally. Erosion is a natural

geological phenomenon resulting from removal and transportation of soil particles by water, wind, ice and gravity (Lal 1995; Gitas et al. 2009).

Soil erosion is severe problem of the developing countries in the world today. The troubles of soil erosion are deforestation, urbanization, overgrazing and over cultivation, land degradation and soon. In the country like Ethiopia, whose people's livelihood predominantly depends on agriculture, maintaining and efficiently using soil is a prominent issue for increasing productivity and in turn income of every society which is a pivotal to reduce poverty at household levels. However, lack of appropriate and effective approaches for the wisely management of the natural resource is a colossal challenge facing the country in its ambition to realize both environmental protection and community's livelihood security. Poor conservation of environmental services has led to its serious degradation in the last 50–60 years (MEA, 2005).

The crisis of soil erosion is serious for Ethiopia, in which the agriculture sector plays the dominant role in the economy and livelihood of the people. The cause, consequences and possible ways of minimizing soil erosion require serious consideration. Soil erosion affects land use and a good proxy and practical assessment of erosion would be extent to which either land quality suffers of human land use activities are curtailed (Adams, Baudic and Orme, 2000).Ethiopian farmers still continuing implementing unscientific way of cultivation which is the main causes for topsoil erosion by wind and rain. Soil erosion is an ominous threat to the food security and development prospects of Ethiopia (MEA, 2005). It induces on-site and off-site costs to both individual farmers, and the society at large respectively that coupled with poverty, fast growing population and policy failure; poses a serious threat to national and household food security.

In the study area, soil erosion is foremost and serious problem. Factors such as: intensive erosion, the topography, deforestation and overgrazing are the focal reason for soil erosion at Bule Kagna Kebele. Soil erosion in the study area followed by numerous convoluted problems, resembling loss of upper fertile soil, reduction of agricultural productivity and scarcity of food are resulted migration of the people which is a pivotal difficulty for poverty reduction. As a result, the intent of these studies was to confirm the importance of local community participation of soil conserving, utilization in the level of community participates and come up with other conservation methods to reduce poverty at household levels at Bule Hora Woreda.

**1.2 Statement of Problem**

The problems of soil lose now have become a worldwide difficulty and the loose of soil either by natural processes or by mismanagement is harmful for agricultural development and moreover for the whole ecosystem (Sharma, 2005:247).Soil deteriorated in different way is the lost of the potential productive capacity of the soil, due to such destructive processes soil erosion, water losing and excessive accumulation of harmful salts (Somani, 2002).

The loss of soil from land surfaces by erosion is widespread globally and adversely acts the productivity of all natural biodiversity as well as agricultural, forest, and rangeland ecosystems (Lal and Stewart, 1997; Pimentel, 1993;

Pimentel et al., 1995; Pimentel and Kounang, 1998). Contemporary with the amassed human population, soil erosion, water availability, energy and loss of biodiversity rank as the major environmental problems throughout the ecosphere.

In Ethiopia, a few studies employed valuation techniques to understand the community participation to conserve soil, farmer's willingness to pay for soil conservation activities using CVM methods e.g. Asrat et al. (2004), Tessema and Holden, (2006), Belay, (2015) and Bamlaku and Yirdaw, (2016). Most of aforementioned studies did not specify soil conserving and its influences on poverty reduction at household level as well as the causes of soil erosion which explain specifically by Jember and Mekonen (2000), larger areas once covered with the forest and productive crops lands and grass lands have been severely degraded. High population increase overgrazing and deforestation are the major cause of land degradation. By the end of 19$^{th}$ century, first of attempt users being made to greater international cooperation particularly, entered field of natural resource protection related to soil degradation while in the 20$^{th}$ century, international wide natural protection organization movement (IWNPOM 2000) was initiated for sharing of knowledge across national boundaries of preservation of natural resources such as soil, water, land and soon. Natural resources protection in Ethiopia is considered today to be higher priority, (Teklewold and Kohlin, 2011).

Therefore, this study was conducted to assessing the imperative problem associated with soil erosion and factors affecting the participation of local community, to come up with some alternative mechanism to minimize, if it possible to alleviate such massive erosion problems, to awaking best mechanism of poverty reduction strategies and references to fill the gaps.

### 1.3 Objectives of the Study

The general objective of the study was to assess the community participation on soil conservation in Bule Hora Woreda, West Guji Zone,Oromia regional state. The specific Objectives were;

- To identify the causes of soil erosion at the study area.
- To explain the method used to conserve soil by household at the study area.
- To assess the problem of community participation on soil conservation at the study area.
- To identify mechanism of soil conservation in poverty reduction at the study area.

## 2. Materials and Methods

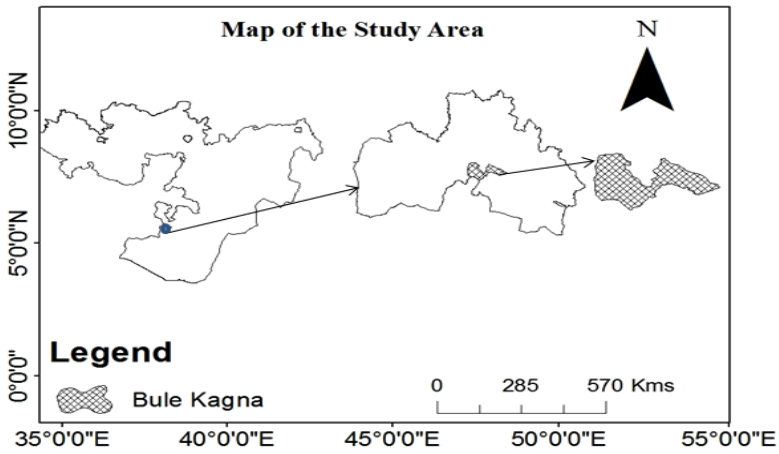
### 2.1 Description of Study Area

#### 2.1.1 Location

Bule Hora Woreda found in Oromia Regional States of Ethiopia, which is one Woreda of West Guji Zone. The Woreda is found 476 km away from Addis Ababa. Bule Hora Woreda is bordered by Dugda Dawa in South, Galana in North, SNNPR in West and Melka Soda in East. The absolute location of Bule Hora Woreda is latitude and longitude of 3°36'0"N_6°38'0"N and

3°43'0"E_79°30'0"E respectively and elevation between 1600 to 3250 meters above sea level.

***Figure: 1.1,*** *Location Map*




**Source**: Prepared by the Researcher

### 2.1.2 Climate and Socio-Economic Activities

Bule Hora Woreda contains two ecological zones, namely: woinedega 78% and Kolla 22%, but there is no clear cut distinction between their boundaries. This knowledge of classification is general in Ethiopia; enable the farmers to recognize accordingly about their agricultural activities. The temperature of Bule Hora woreda ranges from 20°-25°c with mean annual rainfall of 900 to 1100mm with big rains in spring and small rain in autumn. Regarding the moisture of Bule Hora woreda, it is drying sub-humid with moisture index 20 to 10 and with relatively longer growing period of crops which is 110 to 124 days. The annually rain fall ranges between 801mm to 1000mm which is high monthly (i.e. May, Jun July, August and September) and is followed by long dry season (November, December, January, February and sometime March and May.

From agricultural activities the livestock production is one of the economic activities in Bule Hora woreda. The farmers mainly engage in livestock production and small amount of crop production. The major crops grown in the study area include maize, wheat, haricot, teff, chat and bean. Some parts "Inset" is also grown which offers a degree of security during famine. Coffee is also an important cash crop over 400 hectares were planted with it there is also some commercial activities both formal and informal. The area has different agro-climatic and topographic environments; the distribution of vegetation also goes in line with this agro-climatic and topographic landscape. The natural vegetation of the study area has been removed and replaced by cultivated field and grazing land.

As elders had tried to explain, the demand for large area of land cultivation and grazing with population increase, wood consumption for fuel and construction also increased. These conditions resulted considerable amount of deforestation or vegetation removal in the area. Domestic animals had also contributed much for removed of natural vegetation changing in to cultural land scope. Formerly,

dense vegetation had been removed leaving some big trees which are scattered in same place in the study area.

To meet the demand of wood and to fuel wood, farmers began to plant some trees to sustainable the farmer natural vegetation, predominantly the newly introduced eucalyptus (ecomendulosis and eglobus forest), (Ade bacon, 1991: 48).The remnants of indigenous vegetation suggest that the study area covered by forest of juniper'sprocer (Tidy), Douyalis-abyssinia (ashen),Podocarpus (Zigba), olean-africa(bison) and acacia-albida(Girard).

Generally, vegetation at the study area was mixture of sub-tropical and tropical vegetation with some trees species of temperature forests which are common in most high lands of Ethiopia.

## 2.2 Methodology

### 2.2.1 Research Design

The research design for this study would be employed descriptive type of research design. The objectives of this study were described to make clear about community participation on the soil conservation and its impacts on the poverty reduction at household levels. This research was employed both qualitative and quantitative methods. To analysis the raw data which collected from respondents the descriptive analysis for qualitative and numerical data for quantitative had been use.

### 2.2.2 Data Sources, Method of Data Collection and Sampling Techniques

For this study the researchers was use both primary and secondary data. The primary data were collected from sample farmers, model and DAS. For qualitative data, key informants interview would be conducted to support the information obtained from the primary. Again in order to gate in-depth information about the community participation on the soil conservation and its impacts on poverty reduction the researchers would be employed Focus Group Discussion on sampled kebeles. The secondary data source was collected from Journals, books and other published and unpublished documents and reports from the Woreda agricultural and rural resource management office and other.

In this study, the researchers were used to simple random sampling method. Bule Kagna Kebelewas selected from the rural Kebele of the Woreda purposively. The total number and list of households in the Kebele is in the Woreda agricultural office or model farmers and can be available for this study. Therefore, from the total household which constitutes 538 rural households heads, 84 was selected using simple random sampling method because they have responsible to conserve soil erosion in the Kebele level. The reason why the researchers used simple random sampling technique methods was to avoid bias among the total community and given equal chance for all respondents to select. Sample size determined by Yamane Taro (1967);

$S=N/1+N(e)^2$,

Where, S=sample size N=Target population e=Precision or sampling error=0.1

$538/1+538(0.1)^2538/1+5.38$

$=538/6.38$

**=84 sample size**

### 2.2.3 Method of Data Analysis

Descriptive statistics would be used to analyze the data with regard to the objectives of the study. Descriptive statistics such as frequency, and percentage would be used to determine demographic characteristics of the household and discuss the results of the study. Different list of items would be used to collect the types of acclaiming mechanisms by the household from effects of soil erosion as well as its impacts on poverty reduction and analyzed descriptively using the responses from respondents.

On the other hand, the data obtained from the document analysis, and unstructured interview would be analyzed qualitatively.

The researchers would be uses computer software of Statistical Package for Social Science (SPSS version 25.0) for analysis.

## 3. Data Analysis and Interpretation

### 3.1 Background of the Respondent

### 3.1.1 Age –Sex Structure

From field survey and woreda office has got an average of each household has 5 family members. The following table shows that age –sex structure of sampled household.

***Table: 3.1,*** *Age and Gender Structure of the Respondents*

| **Age** | **Respondents** | **(%)** | **Sex** | **Respondents** | **(%)** |
|---|---|---|---|---|---|
| 20-35 | 15 | 17.9 | Male | 48 | 57.1 |
| 36-51 | 34 | 40.5 | Female | 36 | 42.9 |
| 52-66 | 23 | 27.4 | **Total** | **84** | **100** |
| Above 66 | 12 | 14.2 | | | |
| **Total** | **84** | **100** | | | |

Source: Field survey, 2019

The above table shows the household age between 36-51 holds 40.5% (34)which was the highest number, while age above 66 holds,14.2% (12) which was the lower. The household age groups decrease from 52-66, which tell us the working age of the study area were 36-51, which was 40.5 % (34) of the respondents.

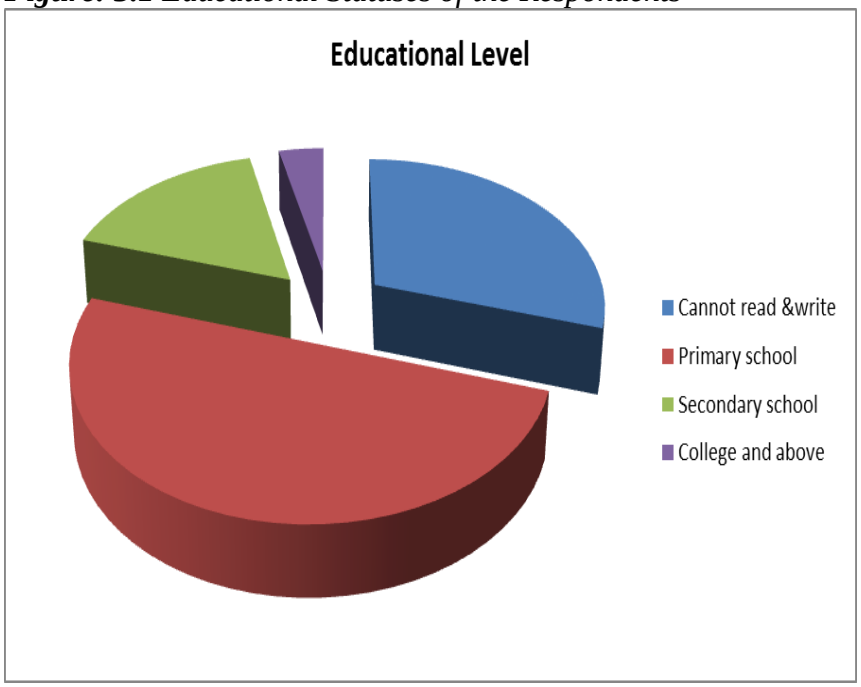
Though, from the above table researchers recognize the age structures of 36-51 were good participants on communities to conserve soil and actively engage to minimize poverty at household levels. The effect of age of the farmers on conservation decision may be either negative or positive Bashaw, D. (2006).Adult age often associated with long years of farming experience could

positively influence of community participation on the soil conservation and engage to minimize poverty.

Again table 3.1shows that 57.1% (48) of the respondents were male and 42.9% (36) of the respondents were females. As we value from table 3.1 the majority of respondents were male and this indicates that both male and female are contribute to participation on the soil conservation and having percentage of reducing poverty.

**3.1.2Educational Level of Respondents**

***Figure: 3.1*** *Educational Statuses of the Respondents*




Source: Field survey, 2019

Education is a means of achieving the sustainable development for a given area by having a well sustaining way of life. The study areas were dominated by primary educational level which was 70% of the respondents enrolled. In the other word secondary and tertiary were the least terms of percent which were 16.7% and 3% respectively. As figure 3.1, indicates that 29.7% respondents were illiterate which was cannot read and write.

In further, most of the household do not get education easily in the study area due to in accessibilities of the schools and farmers household don't fulfill all materials for their children and also children do not want to learn, because of the their parents socio-economic problems. Another difficulty was children migrate to urban area to do other better works and to change their life and work load little attention towards education in the study area.

So low education status affects farmer households in different ways respondents who were uneducated have less capable to guide and support their families while respondents who were educated ensure their families with available basic needs in sustained manner throughout the year. Thus higher educational status was important and positively related with community

participation on the soil conservation and reducing poverty of household effectively.

***Table: 3.2*** *Income and Family size Distribution of the Respondents*

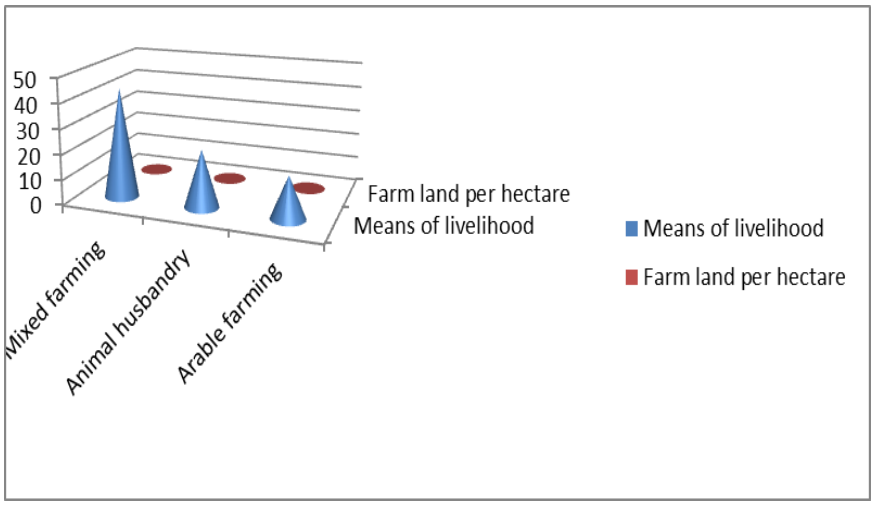
| **Income level** | **Frequency** | **(%)** | **Family size** | **Frequency** | **(%)** |
|---|---|---|---|---|---|
| Below 500 | 14 | 16.7 | < 3 | 15 | 17.9 |
| 500-1000 | 22 | 26.2 | 3-5 | 33 | 39.3 |
| 1000-2000 | 14 | 21.4 | >5 | 36 | 42.8 |
| Above 2000 | 30 | 35.7 | **Total** | **84** | **100** |
| **Total** | **84** | **100** | | | |

Source**:** Field survey, 2019

According to table 3.2 income distributes was not equal between the respondents that more percent of respondents income was above 2000 birr which accounts 30(35.7%) of the respondents followed by 22(26.2%) of respondents those income is lies between 500 and 1000 birr. But a small amount of respondent's income was below 500 birr which account 14(16.7%). The study comprehend that the study area respondents who have more income play a great role on soil conservation and minimizing poverty at household level.

Based on the questionnaire the family size of the respondents was presented above in table 3.3 shows that the majority of the respondents have a family size of above 5 which was 36(42.8%) from the total respondents. Several 33(39.3%) of the respondents have family size which was 3-5 and the remaining 15(17.9%) have a family size less than three (3). Family size plays a considerable role in determining the living condition of the family members of households to reduce poverty. When family size increasing, living condition in the family lands to different problems like shortage of agricultural, soil erosion, land fragmentation, over cultivation, deforestation, soil erosion and land degradation. However, countries with large family size and population densities do not have the problem of community participation on the soil conservation due to better resource allocation.

***Figure 3.2*** *Means of livelihood and Size of Farmland per Household*




Source**:** Field survey, 2019

Meanly it is true in many developing country of the world and also Ethiopia, agriculture is the main means of people livelihood. Hence, it is unquestionable in the study area of Bule Hora woreda Bule Kagna kebele almost all the people are dependent on agricultural, particularly mixed farming system. According to Figure 3.2 most of the household 52.4% depends up on mixed farming while 27.4% and 20.2% of the sampled respondents depends on animal husbandry and arable farming respectively.

As Figure 3.2 shows more than half of the respondents(53.57%) have 3 hectare size of land per household and 9.52%, 28.57% and 8.33% less than < 1 hectare,2 hectares>4 hectares land respectively. This indicates that there was extensive land availability as well as large number of population who depends on agricultural activity to meet their livelihood and at the study area having small lands; implication on soil resources such as deforestation, overgrazing and over cultivation etc. were influence of conservation measures and hinder the poverty reduction mechanisms in different manner. The researchers identify with from the above table, respondents who have large farmland size(>4hectare) may not play a great role on soil conservation practice and diminish poverty positively, but having small farmland size the household farmers play a great role on soil conservation practice and reduce poverty positively again.

***Table: 3.3*** *Causes of Soil Erosion*

| Cause of soil erosion | | | |
|---|---|---|---|
| Physical factors | Item | Respondents | |
| | | frequency | Percentage% |
| | Excessive of rainfall | 20 | 23.8 |
| | Down slope of topography | 12 | 14.3 |
| | Wind | 9 | 10.7 |

| | | | |
|---|---|---|---|
| Human factors | Deforestation | 14 | 16.7 |
| | Overgrazing | 16 | 19 |
| | Over cultivation | 13 | 15.5 |
| | Total | 84 | 100 |

Source: Field survey, 2019

The table number 3.3 shows that, 20 (23.8%) farmers agreed that excessive rainfall and overgrazing 16 (19%) were the main aggravation factors of soil erosion. On the other hand about 13 (15.5%), 14 (16.7%) of the respondents agreed that over cultivation and deforestation were the major causes to soil erosion in the study area respectively. And also table 3.5,12 (14.3%) of the sampled respondent agrees that steepness slope were causes of soil erosion.

From the respondents' data, at the study area the cause of soil erosion was numerous which needs community participation to conserve soil and its influences on poverty reduction to sustain household livelihood in sustainable manners at Bule Hora Woreda.

**4.3 Techniques of Managing Soil Erosion**

The farmers were also asked to identify and report the methods applied by their local to control soil erosion.

***Table: 3.4,*** *Adapting Different kind of Techniques in Managing Soil Erosion*

| Technique | Methods | Respondents | |
|---|---|---|---|
| | | frequency | Percentage% |
| Biological technique | Crop rotation | 12 | 14.3 |
| | Mulching | 10 | 11.9 |
| | Strip cropping | 8 | 9.5 |
| Physical technique | Contour farming | 11 | 13 |
| | Control overgrazing | 15 | 17.9 |
| | Fallow cultivation | 14 | 16.7 |
| | Afforestation | 13 | 15.5 |
| | Tracing | 1 | 1.2 |
| | Total | 84 | 100 |

Source: Field survey, 2019

According to the reports from table 3.4, 15(17.9%) control overgrazing was the most common method to conserving soil erosion, additional method like contour farming 11(13%), crop rotation 12(14.3%) and fallow cultivation 14(16.7%) was the methods to conserve soil erosion of in the study area. From table 3.6, many household in the study area used to control soil erosion by the methods of controlling overgrazing and fallow cultivation.

### 3.5. Community View towards the Value of Soil Conservation

To conserve soil erosion there are a number of agreed activities that expected from farmers household which listed as follows.

- Farmers have responsibility to protect soil erosion individual or cooperation.
- It is necessary for local farmers to know about the impacts of soil erosion
- Local community protect their soil from erosion must have to implement policies designed by government and non- governmental organization concerning of soil erosion.
- Local community people have their own rules and regulations concerning soil conservation and are expected to loyal these rules and regulations.
- Local community peoples are expected to identify the constraints in protecting soil from erosion and come up with mechanisms.

Bule Hora Woreda Agricultural office and field survey by the form of interview.

The above statement that community view towards the value to soil conservation and the researchers explain below in the form of table by the number of code (01) ( 02) (03) (04) (05).

***Table 3.5,*** *Community views towards the value of Soil Conservation*

| Code No | Strongly agree | | Agree | | Disagree | | S/disagree | | Total | Percentage |
|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % |
| 01 | 74 | 88 | 10 | 12 | - | - | - | - | 84 | 100 |
| 02 | 60 | 71 | 22 | 26 | 2 | - | - | - | 84 | 100 |
| 03 | 54 | 64 | 30 | 36 | - | 3 | - | - | 84 | 100 |
| 04 | 65 | 77 | 14 | 17 | 5 | - | - | - | 84 | 100 |
| 05 | 72 | 86 | 12 | 14 | - | 6 | - | - | 84 | 100 |

Source**:** Field survey, 2019

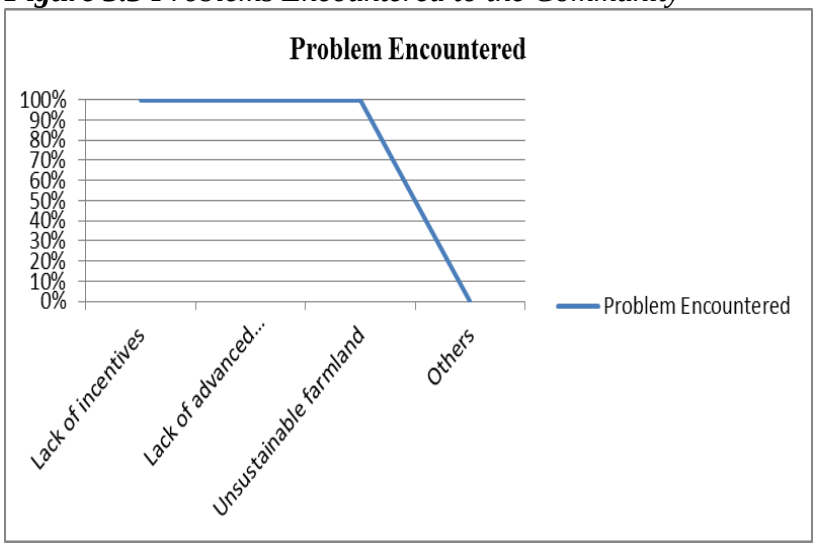
According to table 3.5 from the total households, about 88% and 12% strongly agree and agree respectively to their views that the responsibility to protect soil erosion individually or in cooperation. Those of other respondents who were71%, 26% and 2% strongly agree, agree and disagree for local community or farmer household to discern about the impact of soil erosion on their livelihoods and conserving soil is a pivotal, respondents of 64% and 36% were strongly agree and agree respectively to their views for local community to protect soil from erosion must have to implement policies designed by government and non-government organization concerning soil conservation

and is best mechanisms to reduce household poverty. Although respondent accounted 77%,17% and 5%were strongly agree and disagree respectively to their views that the local community have their own rules and regulation concerning to soil conservation and were expected to be loyal for these rules and regulations. Finally, respondents of 86%, 14% and 6%were strongly agree, agree and strong disagree respondents to views that local community were expected to identify the constraints in protecting soil from erosion and come up with mechanism.

Generally, from the above table 88% local community peoples have good participation to conserving soil erosion and this resulted to reduce poverty at farmers' household levels in the study area.

**3.8 Problems Encountered to the Community on the Participating of Soil Conservation**

***Figure 3.3*** *Problems Encountered to the Community*




**Source:** Field survey, 2019

According to the figure above 45(53.6) of the respondent responded that they were hindered by the lack of incentives, 30(35.7%) of them were hindered by lack of advanced technology, the remaining 9(10.7%) of the respondents were lack of unsustainable farmland. From this, we conclude that lack of incentives was the foremost problem hindered by the community followed by lack of advanced technology which impacts directly to minimize poverty of the household in the study area.

**3.7 Methods Applied by Community to Conserve Soil Erosion**

The local communities used different methods which were used to save the soil from being harmed by different agents. Based on the respondents results they agreed that there are different methods which conserve soil signifies as follows; The local community agreed that control overgrazing as well as crop rotation method in order to manage the soil from severe erosion is alternative method and also afforestation mechanism was the best methods to conserve the soil.

However those methods applied by community participation in soil conservation according to the respondents the farmers household have no more

contact with government and non-government organization which show the way how to conserve the soil from any hazards, the communities of farmers agreed that terracing methods can be affected deforestation. The farmers assume that the responsibility of soil conservation is only applied by individuals of a given area. The farmers are the lack of sustainable initiated cooperation in conserve soil erosion.

According to interview information collected from Agricultural and Rural development office concerning to role taken by the government on soil conservation was:-

- *Creating awareness to local community*
- *Provision of incentives to the household*
- *Provision of equipment required while conserving soil*

**The importance gained from conserving soil by the household:-**

As the interview responded conserving soil have many benefits to household for easily sustaining, making equalizing ecosystem, as whole life existence which related with soil conserving that conserving life in general i.e. it conserves; water quality, increasing fertility of soil, sustain life, preserve habitat ,promote soil organism and boosts agricultural activities that directly related with poverty reduction for households.

## 4. Conclusion and Recommendations

### Conclusion

Soil is a vital natural resource for human being and other animals and plants depend on it's either directly or in directly to get food, shelter and cloth. In Ethiopia the problem of soil conservation methods which is unscientific that is still there was washing away of fertile soil at many place; the same is true for about the study area.

In the study area the factors of soil erosion was such excessive rain fall, steepness of the slope (the nature of topography are the major, while on the other hand human factors such as deforestation, over grazing, over cultivation and steep farming are leading responsible factors of erosion of the study area. The study also confirms that are the consequences of soil erosion in the study area as loss of soil fertility and decrease productivity which leads to poverty. The study also reveals that the view of farmers to conserve soil erosion in the study areas, household have positive views towards soil conservation and also confirm that farmers of the study area responded that there were benefits and challenges sided of methods applied by the community in the soil conservation and its influence on poverty reduction.

### Recommendations

* In the study area soil erosion aggravated by human activities such as over cultivation, deforestation and overgrazing this was impacted to increase poverty on household. Although those which mentioned as human activities are mainly the outcome of fast rate of population increase in turn overlie burdens on use of existing natural resources like soil.

* The farmers of study area should be advised to modernize their indigenous methods of soil conservation and government organization should teach

community member about the importance of soil and creating awareness how household manage soil resources and reducing poverty which impacts on their livelihoods directly.

* The government should create different job opportunity for individual in where the household lives directly depending on soil conservation methods and there management practices in the area. Continuous follow up of the government must be there whenever the farmer's household were doing their regular work and soil conservation practices.

* Finally the woreda agriculture and rural development office Kebele should follow attentively the community participation and discuss the conservation and improving correct measure to control soil degradation and mechanisms to reduce poverty.

**Acknowledgements**

We want express our appreciation to Bule Hora Woreda administration, experts and respondents for sharing their valuable experiences, material as well as cooperation to conduct the study.

**Conflict of Interest**

Author declared no conflict of Interest

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