ISSN NO: 2770-0003
Date of Publication:18-09-2021

Opportunities and Challenges of Rehabilitation of Degraded Land in the Case of Offa Woreda, Wolaita Zone, Ethiopia

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Abstract: In Ethiopia, land degradation has become a serious problem affecting all spheres of the social, economic and political life of the population. It is one of the major challenges to the agricultural development and food security of the country. In order to solve the problem of land degradation, a lot of efforts have been made since the 1970s. This research was conducted in the Case of Offa Woreda selected kebeles. The major purpose of this study was to assess opportunities and challenges of degraded land rehabilitation and the specific objectives of this research were to identify major opportunities and challenges of degraded land rehabilitation in the study area. The study was undertaken in Offa Woreda selected kebeles in the SNNPR region. In the study area the number of total households would be are 2155 and of the total 9% (82) was selected for this research study in order to achieve the objective of the study was gather, For this study both primary and secondary data was generated. The primary data collection was started with a preliminary survey followed by a key informant interview, focus group discussions, and a household survey with questionnaires. The collected data was analyzed using descriptive statistics. The quantitative data were analyzed using frequency and percentage when appropriate. The qualitative data was discussed to substantiate the study. And the results were expressed in the form of tables and graphs. The findings of the study indicated that limited labour availability, high cost of maintenance. Lack of knowledge, topography, soil conditions, high rainfall, high surfaces runoff, poor vegetation coverage, poor monitoring and evaluation, poor implementation and poor training on the technology use are major challenges encountering the land rehabilitation practices in an effective way.

Key words: Land Rehabilitation; Land Degradation; Challenges; Opportunities

Introduction

Background

In Ethiopian, land degradation has become a serious problem affecting all spheres of social, economic and political life of the population. It is one of the major challenges to agricultural development and food security of the country. The rate of the country's land degradation is very high. A large portion of the agricultural land, which is mainly located in the highland part of the country, is affected by severe to moderate land degradation (Kruger et al., 2001. However, is impairing the capacity of forests and the land to contribute to food security and to provide other benefits such as fuel wood and fodder.

Soil degradation increases worldwide, especially in the tropical countries. Management of arable areas by farmers and grazing areas by livestock owners is one of the major causes of soil degradation. Natural hazards including land topography and climate factors such as: steep slope, frequent floods and torn does blowing of high velocity wind, rain of high intensity strong leaching in humid regions and drought conditions on dry regions. Deforestation of fragile and land over cutting of vegetation, shifting cultivation, over grazing, unbalanced fertile use and non-adoption of soil conservation management practice (FAO, 2010).

Ethiopia for the last couple of decades has faced serious ecological imbalances because of large scale deforestation and soil erosion caused by improper farming practices, destructive forest exploitation, wild fire and uncontrolled grazing practices. This has resulted in a declining agricultural production, water depletion, disturbed hydrological conditions, and poverty and food insecurity. Over the past three decades, many governmental and non-governmental organizations have been involved in massive soil and water conservation activities. However, the results achieved in reducing soil erosion problem and improving agricultural productivity has been unsatisfactory (Daniel, 2002).

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As fertile soil is degrade, these who rely on the land are less able to grow or harvest sufficient food, and their hope of improving their livelihoods are diminished. In this edition of new agriculturist, we focus on some of the approaches and policies that can help successfully rehabilitate degraded land. While each of the articles high light different approaches, the common one for successful restoration of farm land is the importance of involving Local communities and the need to change existing agricultural practices (Tadess, 2001).

Objective of the study

General objective: The general objective of the study is to assess the opportunities and challenges of degraded land rehabilitation practices on study area.

Specific objectives

- To identify major causes and consequences of land degradation in study area.
- To identify major opportunities for degraded land rehabilitation in the study area.
- To assess major challenges and shortcomings in undertaking land rehabilitation practices.

Materials And Method

Research Methodology

Description of Study Area

This study was conducted from December 04 to March 10, 2021 in three kebeles, Offa Woreda. The selected study area was one of the Wolaita zone Woreda, SNNPR and the research was conducted to estimate the opportunities and challenges of degraded land rehabilitation practices on study area. Gesuba is the capital town of Offa Woreda which is 29 km from Wolaita Sodo and 414 Km from Addis Ababa capital city of Ethiopia. The Woreda is bounded with Kindo Koysha Woreda in the north, Gamo Gofa Zone in the south, Humbo and Sodo Zuriya in the East and Kindo Didaye Woreda in the west. Based on National Census the projected total population of the Woreda in 2017 was 132,054, out of which, 65,765 and 66,291 were male and female, respectively. There are 21 rural and 2 urban kebeles in the Woreda. The total area of the Woreda is 38,557 hectare. The cultivated proportional land according to the Woreda agriculture Office information was 22,912 hectare or (59.4%). According to CSA (Central Statistical Agency) the Woreda is situated at 6^{o}37’07.63’’N-- 6^{o}50’07.10’’N, latitude and Longitude: 37^{o}24’18.06’’E-37^{o}89’13.27’’E and altitude: ranges 1200 -2800 meter above sea level. Geo-ecology of Offa Woreda: Kola, Weynadega and Dega (22, 62 and 16%) respectively. The Woreda’s annual average rainfall is 800-1400 mm and annual average temperature, 14 ^{o}C-34 ^{o}C (Offa Woreda Agriculture Office).

Study design

The study was designed in such a way that data could be gathered on biophysical (vegetation and soil) in the land rehabilitation and in the open site. Community perception towards rehabilitation development will be assessed. Reconnaissance survey will be made before the actual survey operation in order to obtain a general picture about the land and the open site. Details of both biophysical and community perception evaluation surveys was conducted after the preliminary survey.

Sampling Techniques

For the purpose of this study simple random sampling technique was employed to select the respondents. This is by considering or understanding of the distance, the second reason is since there is shortage of time and budget so it is difficult to conduct research in other far places. In the simple random sampling will be used to select the sample household for household survey.

These techniques was employed with the assumption of it avoids bias of representative and it create an opportunity to the all people in the population equal chance of being selected. The sample size for this study was determined by using The Slovin's Formula, which is as follow:

Slovene formula:

$$n = N/(1 + Ne^2$$

$$n = 2155/\ (1 + 2155 * e2)$$

n=82 Therefore actual sample size for this research is 82.

Where: n = sample size

With 90 degree confidence level

ISSN NO: 2770-0003
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N = total number of household from k (2155)
e = margin of error (is the level of precision with the 9% of sampling intensity).

Method of data collection

Both primary and secondary data was used for this study. The primary data will be collected using interview and semi structured questionnaires. In addition, observation and focus group discussion will be done.

The secondary Data was collected from three selected Kebeles (Yakima, W/Dekeya and Galako) and Woreda Agricultural offices, books, Journals, unpublished thesis, project report, and workshops.

Data Analysis

The collected data was analyzed using descriptive statistics and the results expressed in the form of tables and charts.

Results And Discussion

In this chapter the researcher tried to discuss and analyzes the date from questionnaires, observation and discussion. The researcher has interviewed 82 respondents from selected Keble's to get information about the problem that was.

Background of the Respondents

Demographic characteristics of household

In demographic parameters: age, sex, educational status, marital, family size and land size status of respondents are discussed as baseline for study since land rehabilitation practices are participatory programmers encompasses all parameter of the respondents is important to determine which have opportunities and challenges of land rehabilitation practices .As presented in Table 1, among the interviewed households 91.463%were males headed households and remaining 8.537% were female headed households. Among them 86.55 % were productive age classes and 13.45 % were unproductive. Age classes of <15 and >65 % are categorized as unproductive and 15-65 are productive class. The productive age class is playing very important roles in any development activities including of land rehabilitation practices activities in the study area.

Based on the below table 1. About 1.2% single, 78.0 % married, 8.5 % divorces and 12.2% were widowed. Marriage characteristic have the effect up on development initiatives. The households' that have head and husbands and their children undertaking collective participatory action on their agricultural land, But those who have the single, divorced or widowed can undertake the action individually cannot easily complete the rehabilitation action in on farm lands. Below table 1 reviled that more than half which covers 3.65% single, 82.537.0%, married client among respondent. The number of widowed respondent covers 4.878% of the total respondents and remaining 8.53% were divorced. This shows that the largest groups of community who were participate on rehabilitation practices were married. The educational status is one of the factors on the community land rehabilitation practices .The community having large number educated individual easily accept technology regarding rehabilitation practices and undertaking and implement it practically. The below table 1 shows that among total numbers of respondents that attends school currently and educated including who are able to write their name is almost 96.59 % and remaining respondent almost 13,41% was can't read and write. This shows that most of the respondents who participate in the area land rehabilitation practices were educated.

Religion is one of the factors which affect rehabilitation practices in the case of Ethiopian context. There are different religious holidays that do not allow the labor work regarding respective religious. Majority of the People in the study area were dominantly protestant and they enforced to celebrate this holiday in the month. This may have negative effect on the rehabilitation practices. The below table 1 shows that among total number of respondent the dominant group almost 96.3.% were protestant and the remaining 3.7% follows orthodox. This reveals that most of the people who participate on the area of rehabilitation practices were protestant.

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Table (1) Demographic characteristics of Respondents

parameter	Status	number	%
Sex	Male	75	91.463
	Female	7	8.537
	Total	82	100
Age	18-30	30	36.55
	31-45	41	50
	Above 65	11	13.45
	Total	**82**	**100**
Education	Can't read and write	11	13.41
	Elementary	50	60.9756
	High school(9-12)	17	20.731
	Diploma and above	4	4.878
	Total	**82**	**100**
Religion	orthodox	3	3.7
	protestant	79	96.3
	Total	**82**	**100**
Marital status	Married	68	82.9268
	Single	3	3.6585
	divorces	7	8.53
	Widow	4	4.878
	Total	**82**	**100**

Source: structure interview in 2021

Land owned size

As shown on the figure 2 below. Respondents were requested to give feedback on their estimated total size of their own farm lands. Based on this, around 46.3 % of individuals in the study area owned plot of land less than 1ha, 40.20. % Were owned 1-2 ha of plot land, 11.0% were owned 3-4 ha and remaining 2.4 % had plot of land above 4ha. This represents that majority of the individual in the study were owned the plot of land less than 1ha and few of them owned land above 4ha. This replays that there is shortage of farm lands in the study area.

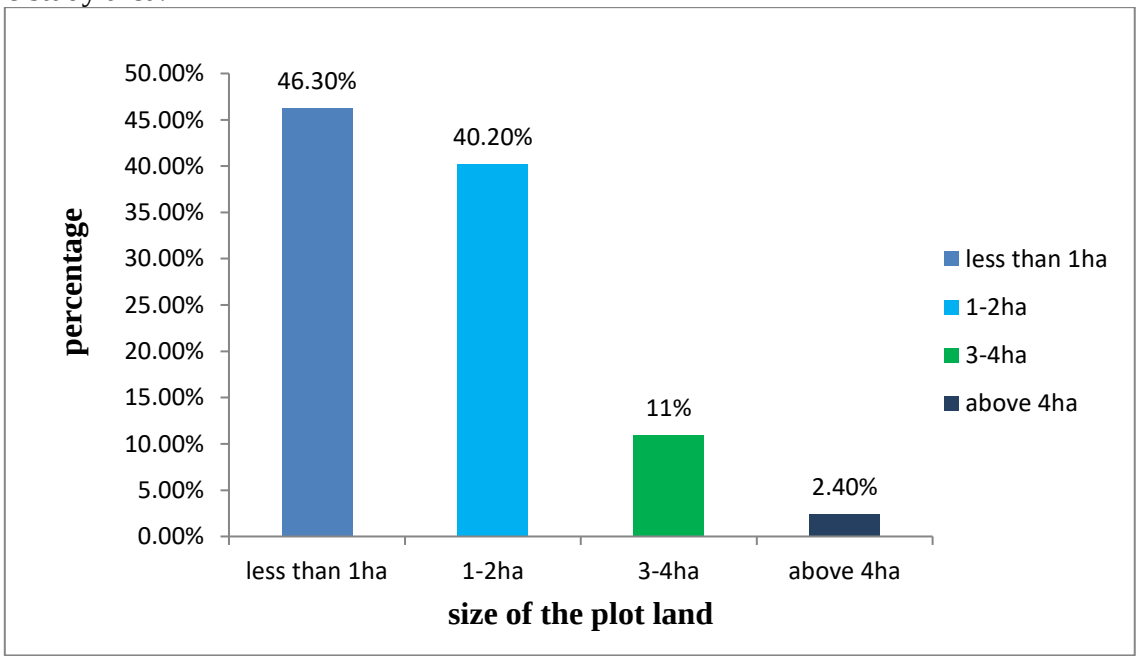

Figure 2: Size of the owned lands.

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Topographic positions of the plot lands owned by individuals in the study area

Figure3 shows topographic positions of plot lands owned by individuals in the study area. Based on this figure, about 64.6 % of individuals owned farm land which is found topographically on slope area, 29.3 % of individuals owned the plate land and remaining 6.1 % had land that found in valley area. This indicates that majority of respondents in the study area owned slope land which can be easily affected by erosion and were also susceptible for degradation by water erosion.

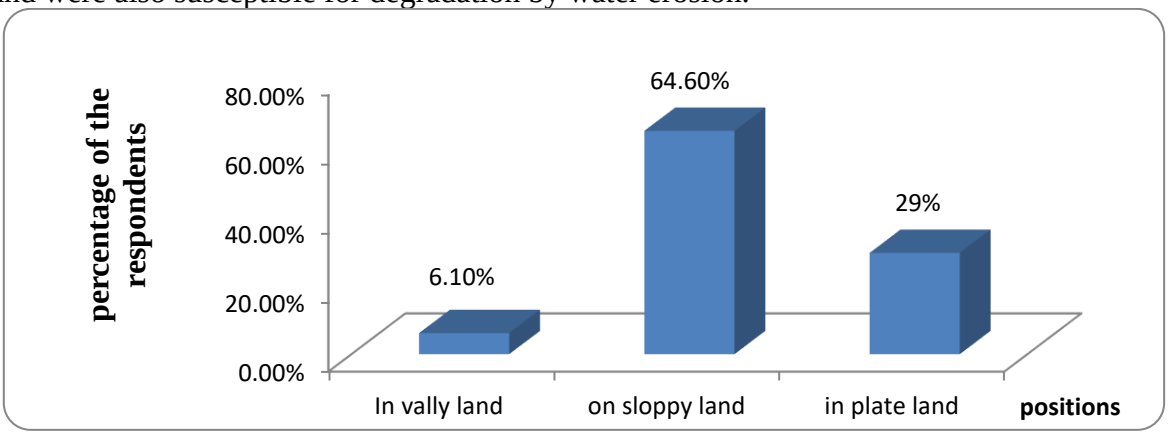

Figure 3: Positions of the plot lands**.**

Causes of land degradation in study area

As shown on the table below 2&3, we classified the cause of land degradation as immediate and underlying and interviewed individual to give feedback by ranking as 1st, 2nd, 3rd, and the like. Then among the immediate causes, no fallowing (**13.4**%) of their farm land was the and 2nd a most immediate cause of slopes land cultivation, (**71.1**%),overstocking (**4.88**%) ,deforestation (**7.31**%) and limited use of conservation measures(**6.1**5%) which was the last and least concern from community point of view.

And regarding underlying causes poverty (47.6%) was the base and fundamental underlying cause of our land degradation followed by, land shortage (48.8%), steep topography (47.1), heavy rainfall (45.1.1%), economic pressure (50.0%) population growth (41.3%) and as 1st ,2nd,3rd,4th, 5th, averty were the dominant immediate and underlying cause of land degradation in the study area respectively. Cultivation is the major immediate cause of land degradation in the study area and population pressure is dominant underlying cause but in our finding lack of fallow was dominant immediate cause and poverty was the major underlying cause (mesfine desalegn 2010). This indicates that poverty aggravates other related causes of land degradation in the study area.

Table 2: **Immediate causes of land degradation (n=82)**

Parameter	Frequency	%	ranking
Slope cultivation	59	71.1	1st
Lack of fallow	11	13.4	2nd
Deforestation	6	7.31	3rd
Over grazing	4	4.88	5th
Limited use of conservation	5	6.1	4th

Source: structure interview in 2021

Table 3: Underlying causes of land degradation (n=82)

Parameter	Frequency	%	ranking
Poverty	21	25	1st
Land shortage	18	21.1	2nd
Economic pressure	15	18.3	3rd
Population growth	14	17	4th
Heavy rain fall	9	10.1	5th
Steep topography	5	6.1	6th
Total	82	100	

Source: structure interview in 2021

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Forms of land degradation in the study area

According to the below Table 4, Individuals in the study area were requested to rank which of the above forms of land degradation is common in their farm land. As it is clear that erosion by water (45.22%) is the top of all forms and ranked as 1st followed by soil fertility decline (42.7%), forest degradation (12.2%) and erosion by wind (0%) as 2nd, 3rd, and 4th rank respectively. this shows that the dominant form of land degradation was water erosion and wind erosion was the no concern from community point of view in the study area.

In the research conducted in high land of Kambata Tambaro zone, the researcher concluded that erosion by water and deforestation were major forms of land degradation in the study area (mesfin desalegn 2010) which was the same as what we did found.

Table 4: Forms of land degradation (n=82)

Parameters	Frequency	%	ranking
Water erosion	37	45.22	1st
Forest degradation	10	12.2	3rd
Wind erosion	--	0	-
Soil fertility decline	35	42.7	2nd

Source: Structure interview in 2021

Common types of erosion by water in the study area

The graph 4 shows the major types of erosion by water. About 42.7 % of respondents replied that rill erosion is the dominant form of erosion by water and they also responded that rill erosion is visible and helps us to recognize whether our land is being affected by erosion or not. Others around 23.2 % replied that sheet erosion is dominant form of erosion in our farm land, 17.1 % responded that all form of erosion is recognized in our farm land and remaining 13.4 % recognized gully erosion on their farm lands. Therefore this shows that majority of respondents in the study area recognizes rill erosion as a dominant as compared to the others.

In the research conducted SNNPR in Kambata Tambaro zone, researcher found that sheet erosion is dominant type of erosion in the study area (mesfin desalegn 2010). But in our finding the rill erosion is the dominant as compared to others. So the deference is in that sheet erosion in the area was research conducted is easily recognizable by farmers

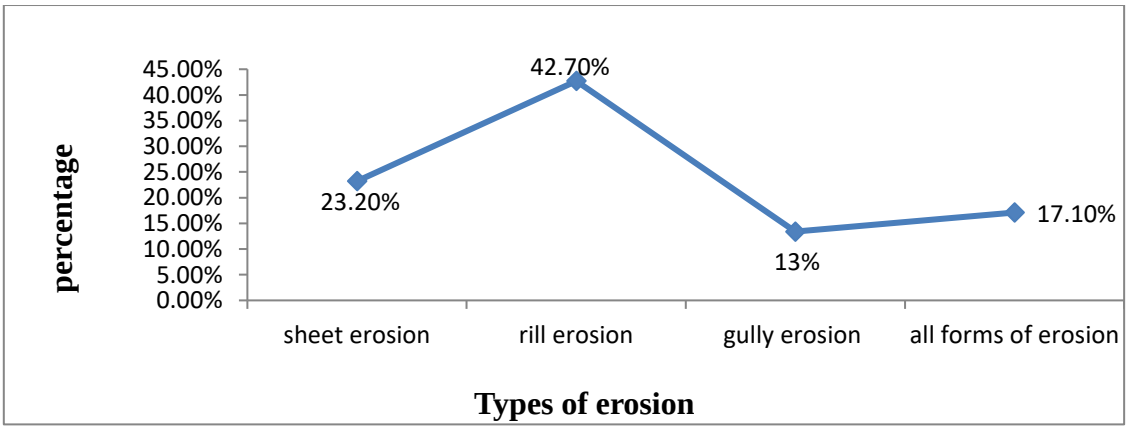

Figure 4: Types of erosion

Indicators of land degradation

As shown on the below figure 5. We tried to interview about what were the indicators of land degradation and how they recognize whether their land is being affected by erosion or not. However around 43% of individuals in the study area replied that visible rills on the cultivated plot of land is the major indicator of land degradation that helps us to recognize our land which being affected by erosion and about 23.2% also responded that decreasing of soil depth observed when ploughing indicates us to recognize soil

ISSN NO: 2770-0003
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erosion, beyond this about 19.5 % replied that deposition of sediments below edge of plot forces us to identify lands being affected by erosion and remaining 14.6 % responded that observed color changes after run of leaving the plot is major indicator of soil erosion in our farm land.

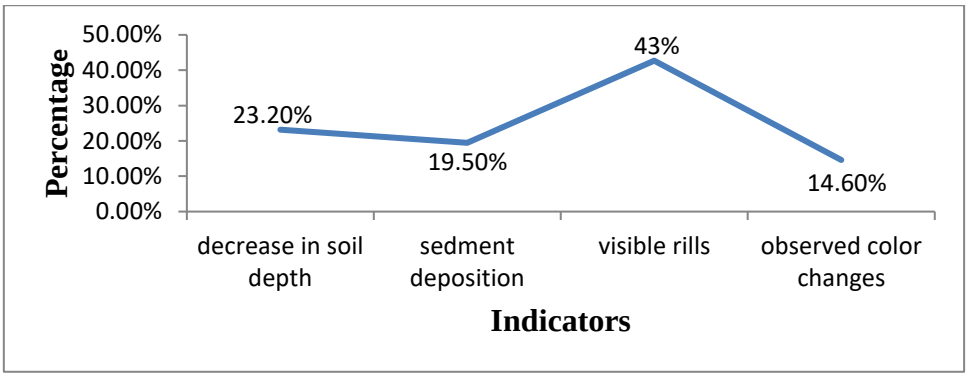

Figure 5: Indicators of land degradation

Common Land Rehabilitations Practices

As table 5 below shows that all individuals in the study area actively involved in land rehabilitation practices listed below. Accordingly starting from the most dominant land rehabilitation practices in the study area, around 30.5 % of individuals in the study area replied that use of ditches to slow down surface run off and to divert it in to appropriate water ways is the dominant land rehabilitation practice in our area followed by use of vet ever grass strip which constitutes around 22.0 % to trap sediment and slow down over land flow, individuals in the study area were familiar with graded bunds(18.3%) which is important to divert excess water to water way from farm land. In the study area use of agro forestry (15.9%) as means of land rehabilitation was common but its primary objective is to improve their livelihoods. Beyond this area closure which accounts 9.8% as means of land rehabilitation practice was common but least concern from community point of view.

According to the result obtained from the finding conducted in kambata zone (mesfine 49esalegn 2010) , contour ploughing is the major land rehabilitation practice in the area but in our finding use of ditches and vet ever grass strip is the dominant as compared to the others.

Table 5: land rehabilitation practices in the study area.

Parameters	(%)
Area closure	9.8
Agro forestry	15.9
Graded bunds	18.3
Contour ploughing	3.7
Vet ever grass strips	22.0
Ditches	30.5

Source: Structure interview in 2021

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Figure 6: Common Land Rehabilitations Practices in the study area.

Soil fertility Management Practices in the Study area

Farmers at individual level practice different land management activities mainly to increase agricultural yields and to conserve the natural environment on their plot of land. Farmers apply chemical fertilizers to obtain high agricultural yield. Chemical fertile Inorganic chemical fertilizer application is a prerequisite in the study area (29.27) as many parts of the country experience due to loss of soil fertility which is caused by erosion. According to survey results, Agroforestry and compost (29.27% and 13.41% respectively were one of the most important methods of improving soil fertility as well as conserving soils on cultivated fields. Manure is used to be important input for promoting the fertility status of the soil. Its application to farmland raises the nutrient level of the soil, increases infiltration and reduces soil erosion. But only3.7 % of the respondents in study area use manure to improve soil fertility but its utilization as means of soil fertility improvement was less as compared anthers .this shows that individuals in the study

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area does not give attention to manuring as means of improving soil fertility rather they impasses on use of vet ever grass strip (26.8%) as means of soil fertility improvement.

Table 6: Soil fertility management practices (n=82)

Parameter	frequency	%
Chemical fertilizer	24	29.27
manuring	3	3.7
Agroforestry	17	20.73
Compost	11	13.4
Crop rotation	14	17
Inter cropping	5	6
Grass strip	8	9.8
Total	**82**	**100**

Source: Structure interview in 2021

Opportunities of degraded land rehabilitation

Family members motive to involve in land rehabilitation practices.

Regarding the involvement and support of household members to land rehabilitation practices, and 45.22% of sampled household of selected kebeles confirmed that their family members are willing to participate in any natural resource conservation activities.

Assistance/cooperation of neighborhoods for land rehabilitation practice

Respondents were also asked to tell the assistance and cooperation of the neighboring people to land rehabilitation practices. Accordingly 14.63 respondents in indicated that there is cooperation among the societies to rehabilitation degraded areas on their farm plot and community lands. 57.3% of respondents in show that some people in their localities are willing to perform any resource management practices.

Table 7: Involvement of the society on land rehabilitation practices.

Item	Frequency	%
Involvement of the society of society's population increase	12	14.634
Involvement of society as population decrease	10	12.2
No changes	6	7.31
Family members motive to involvement as increase	47	57.3
Family members motive to involvement as decrease	2	2.44
No changes	5	6
Total	82	100

Source: Structure interview in 2021

Focus group discussions:

A number of reasons were indicated by the Focus group discussions as to why the assistance gained increase over time. The sampled household heads who indicated increase in assistance overtime gave the following reasons:

- *People give more attention for long-term benefits rather than working for short-term benefits.*
- *The fact that many people are trying to focus on their social gains rather than personal benefits*
- *Increase in the level of awareness among some communities to minimize problems of land degradation in cooperated manner than performing at individual level.*
- *The increase in awareness among communities regarding the problem of land degradation. As a result, there are extensive efforts made by all stakeholders to conserve natural resources and to perform land restoration practices in the study area.*

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Access to extension services related to land rehabilitation practices

Any new agricultural practices in particular area need adequate mechanism for transmitting information. Lack of relevant and timely information can prevent a widespread practice of natural resource conservation activities. Access to extension services helps farmers to gain better understanding of the potential effects of soil erosion and benefits of soil and water conservation practices as well as enhancing knowledge on the application of soil and water conservation technologies. In the study area, as it can be seen from Table 8 respondents were asked whether they have access to any extension services related to land management practices. Accordingly, 79.3% of the respondents replied that they have access to extension services that promote land management practices. Significant number of respondents (19.9%) reported that they have no any access to extension services related to land restoration practices. Those respondents who have access to extension services were asked whether they implemented it on their land or not. The services they got as a result of extension programs include technical advice on the utilization of chemical fertilizer, improved seed and pesticides, better farming methods and soil and water conservation practices (terraces and check-dam construction, water harvesting and compost preparation). However, as they reported, the services were not enough to effectively minimize or halt natural resource degradation as compared to the magnitude of the problem.

Table 8: Access to extension service related to land restoration practices

Access to extension service related to land restoration practices		Frequency	%
Access to extension program	Yes	65	79.3
	No	17	19.9
	Total	82	100
Extension programs implemented by HHs	Yes	69	84.15
	No	13	15.9
	Total	82	100
Source of information for land management	Traditionally	68	82.7
	From Das (development agency)	7	8.53
	From NGOs	7	8.53
	Total	82	100

Source: Structure interview in 2021

Table 8 shows the source of information for the respondents to carry out land rehabilitation practices. In the study area, according to the survey report, development agency are the major source of information for land rehabilitation practices followed by the traditional sources (own experience) by 82.7% which farmers use to carry out soil and water conservation practices. About 8.53 % and 8.53 % respondents indicated that Das and NGOs respectively are sources of information for land rehabilitation practices in their own and communal lands. Regarding the work of development agency as source of information, participants said that the number of development agency working in a Kebele is this helped them to reach the society easily to give timely advice and technical support for SWC practices.

Government efforts in the rehabilitation of degraded lands in the study area

Land rehabilitation practices, as issues of special concern, are within the limit of the in Offa Worde Agricultural and rural development office. Due to increase in human population pressure, terrain nature of land, over-cultivation, deforestation and irregular rainfall pattern, the agricultural production in the study area has been decreasing over time. In order to increase farm productivity and conserve the resource base of the Woreda. Primarily, rehabilitation efforts were introduced with the objectives rehabilitation degraded lands and as well increasing food security through increased food crop production (Ganta 1991). As a result, most of the restoration structures for the construction of physical soil and water conservation measures and forestation and agro-forestry components, were practiced to protect land degradation. Some widely used structural land rehabilitation measures are described in the following few sections in the study area.

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The numbers of NGOs which are concerned with performing different development projects in three selected kebeles are more as compared to other keble. Among these, World Bank is one local NGO which widely involved in environmental rehabilitation works. According to the information obtained from World Bank office, the activities of rehabilitating the degraded areas started in 2007. At the beginning, the main activity of World Bank was sensitization and mobilization of the society through panel discussion, Workshops, training and establishing community committees. Then establishment of nursery and seedling production, plantation and distribution among the societies are the main tasks of World Bank. In addition, distribution of fruits and coffee seedlings in order to introduce agro forestry practice is part of the activities. Moreover, soil and water conservation structures are practiced on individual lands to minimize soil loss and to increase productivity of farm land. With the involvement of the society and government cooperation extremely degraded areas around hill side are enclosed to protect from encroachment of livestock. World Bank, on the study area, to minimize the pressure Exerted on natural vegetation by human being, is working on alternative energy sources. Among these activities, training on biogas construction and fuel saving stove construction and distribution are the main ones. In addition, an alternate way of constructing houses i.e. construction of model mud house block is being introduced in the Keble and training has been given for the society on how to make a mud block and how to construct it. Promotion of non-farm activities is another activity practiced in the Keble

Focus group discussions:

These activities help the society to earn their livelihood other than farm activity and reduce pressures to be exerted on land resources by promoting conservation activities. The non-farm activities currently being practiced in this study area by World Bank include and other NGO:

- *Establishment of poultry farm and distribution of chickens*
- *Provision of beehives with accessories*
- *Provision of grafted high land fruit trees*
- *Purchase and provision of sheep and/or goat*
- *Treadle pump provision*
- *Training on business entrepreneurship Construction of bridges, land dug well etc.*

Socio-economic, institutional and Environmental challenges of land rehabilitation practices in the study area.

As it is shown on the below table 9, There were many challenges associated with land rehabilitation practices in the study area. Regarding socio-economic challenges about 46.3% respondents replied that lack of materials like stone to undertake land rehabilitation practices is the major challenge followed by high cost of maintenance (41.5%) and lack of knowledge how to perform and maintain the structures (9.8%) are major socio-economic challenges from community point of view. Regarding environmental challenges almost all factors are dominant in the study area but among them around 32.9% of the individuals replied that topographic formation is the major environmental challenge followed by climatic conditions such as high rainfall, high surface run of and others which constitutes around (31.7%) and 26.0% replied that soil conditions like water logging are also another environmental challenges associated with land rehabilitation practices in our area and only 8.5% were replied that poor vegetation cover is another environmental challenge that in bits our land rehabilitation practices. This shows that topography is the dominant factor affecting land rehabilitation practices in the study area and poor vegetation cover is least concern from their point of view. As we tried to show result on the above table, institutional gaps resulting from outsiders or from higher authority are also another factors challenging land rehabilitation practices in the study area. Accordingly about 56.1% of individuals confirmed that poor monitoring and evaluation of introduced technology is fundamental institutional factor that affects our land rehabilitation practices. Majority of them also narrated that one's outsiders introduce given technology and they poorly examine what is the effect of introduced technology in our way of life. Beside this around 40.2% of them replied that after being introduction of new technology, they poorly put the introduced technology in to the ground and remaining 3.7% replied that poor training on technology use affects our land rehabilitation practices. As the result shows that poor monitoring and evaluation of introduced technology is the major institutional challenge in the study.

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Table 9: Socio-economic, institutional and environmental challenges (n=82)

Parameters /Types of challenges		Frequency	Percent (%)
Socio-economic challenges	lack of knowledge	10	12.2
	lack of materials cost of maintenance	72	87.8
	Total	82	100
Institutional Challenge	Poor training on technology	29	35.4
	Poor implementation	27	32.93
	Poor monitoring & evaluation	26	31.7
	Total	82	100
Environmental challenges	Topography	47	57.3
	Soil condition	5	6.09
	Vegetation cover	30	36.14
	Total	82	100

Source: Structure interview in 2021

Conclusion And Recommendation

Conclusion

Based on the above result lack of fallowing, sloppy cultivation, deforestation and limited use of conservation measures, poverty, land shortage and heavy rain fall are the major immediate and underlying causes of land degradation in the study area respectively. As it was clearly indicated in the result and discussion part different land scopes (Geographical features) such as valleys, slope, mountain as well as level land have various effects on land rehabilitation practices.

According to the respondent perception the highest causes of the erosion is due to sloppy of land being erodible. As the respondent indicated the major land rehabilitation practices undertaken by the farmers are vet ever grass strip, ditches, agroforestry, area closure, graded bunds, and couture ploughing. In the study area poor implementation and poor monitoring and evaluation of newly introduced land rehabilitation technology is considered as major institutional gape and affects effective use of technology from community point of view. Observed color changes, deposition of the sediments, visible rills and decrease of soil depth when ploughing are important indicators of land degradation in the study area that helps farmers to recognize their farm lands being affected by erosion.

Recommendation

Based on the finding, I would like to recommend the following point: The natural resources manage cultivation is the major immediate cause of land degradation in the study area and population pressure is dominant underlying cause. This indicates that poverty aggravates other related causes of land degradation in the study area.

- Much afforestation should be active in implementing; monitoring and evaluating the farmers to be effective in using newly introduced technology practices.
- The governmental and non – governmental organizations which focusing on natural resource conservation should facilitate the way to create awareness about land rehabilitation practices for farmers and with respect to benefits of environmental, economic and social impacts.
- Land rehabilitation practice should undertake by the whole society, because it contribute to improve living standard of poor farmer as well as to improve the economy of the whole society.
- Participation by farmers during planning and implementation of introduced land rehabilitation technology should be given a due attention which may create responsibility, accountability and since of ownership.

ISSN NO: 2770-0003
Date of Publication:18-09-2021

Government should expand the extension worker or DAs in the study area to cover the action for all community.

Conflicts of Interest:

The authors declare no conflict of interest.

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