

Research Article

# Assessing the Roles of Stakeholders in Land Rehabilitation Measures and Its Management Practices: The Case of Soro Wereda, Hadiya Zone, Central Ethiopia

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## Abstract

The purpose of this study is to assess the roles of stakeholders in land rehabilitation measures and its management practices in Soro Wereda, Hadiya Zone, Central Ethiopia. To achieve the objectives set, appropriate data was collected from three sample kebeles which were selected due to more rehabilitation measures in these selected kebeles. The data for this study was collected via structured interviewees, focus group discussion, key informants and field observation. Maintaining contact with natural resource experts has a great role to avert land degradation through initiating households to participate in the rehabilitation process. Without the active involvement and participation of stakeholders, it is not possible to restore the degraded land. Active participation and involvement of relevant stakeholders plays a pivotal role in rehabilitating of degraded land. These are farmers, development agents; NGOs and government have its own participation in the rehabilitation process. The communal land is more vulnerable to the degradation due to lack of sense of ownership, most people use the communal land unwisely, overgrazing, lack of soil and water conservation measures, the community gives more emphasis to the private land, lack of management, all farmers use the communal land intensively because they consider it as the common resource and seeing one the others for conservation and protection purpose. Training plays a crucial role by developing the understanding of all stakeholders about the program and helps to involve within it without resistance to change because they gain knowledge and skill to solve the practical problems. The major management practice to conserve the restored land is area closure because from the total of 97 sampled households all (100%) opted that area closure as the management practice and followed by this about 80(82.5%) opted that appointment of guards for the management of reclaimed land. Reclaiming of degraded land requires a lot of energy, capital, the participation of various stakeholders and different measures should be undertaken.

## Keywords

Land Degradation, Rehabilitation, Stakeholders, Management Practices, Watershed

## 1. Introduction

The twenty-first century is a time by which the world is getting seriously confronted by issues of sustainable use of natural resources. Despite the emerging recognition of their

decisiveness for the survival of humanity on the planet, these days, water and land ecosystems are being degraded at an alarming rate [2]. In Ethiopia, land degradation has become a

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Received: 30 January 2025; Accepted: 13 May 2025; Published: 19 June 2025



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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 [4]. In a country like Ethiopia where a rapidly growing human population is inducing overexploitation of the available productive natural resources, restoration of the vast degraded landscapes that exist in the country will have a valid and important role in harnessing sustainable development [9].

According to Woldeamlak [15] land degradation in general and soil erosion in particular still remain the major challenges that are adversely affecting the agricultural performance of the country; hence the call for improved land management practices. Restoration of an ecosystem is always difficult and costly to be obtained [10]. To solve the problems of land degradation in Ethiopia, many efforts have been made since 1970s. Moreover, most of these projects were not successful due to a lack of effective community participation, limited sense of responsibility over assets created, inefficient implementation methods, inadequate policies, lack of cooperation among stakeholders, unmanageable planning units, and evaluation techniques for their feedback [16].

In the 1990s, a new generation of developing country watershed management operations focused more on the problems of natural resource management and poverty reduction in upland areas, using farming systems and participatory approaches [16]. Active participation of stakeholders plays a pivotal role to achieve sustainable land management practices and it is very difficult and impossible to achieve the program in Ethiopia without participation of stakeholders. There are a number of stakeholders who are directly or indirectly involved in these activities. In Soro Wereda some of the degraded lands are restored today with the joint efforts of the different stakeholders and according to the Soro Woreda Agriculture and Natural Resource Development Office [11] more than 1236 ha of the degraded land are restored and the trend seen increasing as the area rehabilitation measures are taken. However, lack of the proper management practices vulnerable to easily degradation of restored land. Restoring of the degraded land requires active participation and involvement of the various stakeholders. So, the actors should be involved in the rehabilitation process. The actors are government, DAs, farmers, research institutes, universities and NGOs.

## 1.1. Objectives of the Study

### 1.1.1. General Objective

The general objective of the study was to assess the roles of stakeholders in land rehabilitation measures and its management practices in the study area.

### 1.1.2. Specific Objectives

1. To assess the participation of stakeholders in land rehabilitation process.
2. To examine the management practices in the land rehabilitation process in the study area.

## 1.2. Research Questions

The main research questions set to address the objectives that are mentioned above are:

1. What roles do stakeholders play in land rehabilitation process?
2. What are the management practices concerning the restored land?

## 2. Materials and Methods

### *Description of the Study Area*

The study was conducted in Soro district. Soro is one of weredas in Hadiya Zone which is located at 7° 30'-7° 43' North latitude and 37° 35'-38° 05' East longitude. It is situated in the Southern-tip of the zone and bordered by Gombora district in the North; Oromia Region (Omo River) and Yem Zone in the West; Dawro Zone, Kambeta Zone, and Duna Wereda (District) in South and Southeast; Limo wereda (District) and again Kembata Timbaro Zone in the Northeast and East. The total land area of the district is 58,061 ha which comprises of 46 rural kebeles. The administrative center for Soro wereda (District) is Gimbichu town; which is 264 km far from Addis Ababa and 32 km far from Hossana city the regional capital, of the Central Ethiopia.

Soro woreda is a typical of the moist weyine-dega agro-ecological zone (8%dega, 55%weyna-dega and 37% kola). The mean annual total rainfall is about 1260mm and has two rainy seasons, Belg and Kiremt. Belg is the short rainy season and lasts between March and May. The Kiremt season, which is the longest rainy season, lasts between June and September. More than 75% of the total rain falls during this season and the highest rainfall occurs in July and August. Rain that occurs during the Kiremt season is very intensive and, hence, the severity of soil erosion is high during these two months. Most of the crop production also takes place during the Kiremt season. Even though there were some variations with respect to cessation, amount and distribution, the belg rains were by large favorable in most areas of the district. For example, onset of the rain was timely in almost all Belg producing kebeles of the district and most districts of the Hadiya zone [7].

The topography of wereda contains plain 31%, mountain 11% and moderately sloping and steeping lands are 58%. The altitude ranges from 840m to 2850meter above sea level. According to Soro wereda Finance and Economic Development Office [12] the total population of Soro wereda is about 245,578, of which 123,288 or 50.2% are males and the rest

122,290 or 49.8% are females. The current land use of Soro Wereda can be categorized as annual crop land 23722ha (64.9%), perennial cropland 2040ha (5.58%), grazing land 1623ha (4.4%), bush and forest land 3248ha (8.9%), degraded land 2771ha (7.62%) and others 3144ha (8.6%) [11].

### 3. Research Methodology

#### 3.1. Research Design

The researcher used descriptive survey research design for it allows the collection of quantitative and qualitative data through different methods of data collection and which states the qualitative and quantitative methods and their triangulation.

#### 3.2. Sample Size Determination and Sampling Techniques

From the 46 kebeles the researcher selected three kebeles and the selection was based on the contact of experts from the office Agricultural and Rural Development and Environment, Forest and Climate Change especially with the Natural Resource Development and Conservation Work that are crucial to the study. The three kebeles are Hirche Uyaya, Shara and 1st Hankota. At present around 57 ha of the land is rehabilitated in these kebeles. The total households of the three kebeles were 2912 and 3.3% of them were used as samples.

In order to draw representative samples, first the list of all eligible household heads respondents residing in the three kebeles was prepared. The following formula is used to calculate the sample size with a 90% confidence level and 0.1 errors [6].

To get the sample size

$$n = \frac{2912}{1+2912(0.1)^2} = \frac{2912}{1+2912(0.01)} = \frac{2912}{1+29.12} = \frac{2912}{30} = 97$$

Therefore, 97 respondents were selected by using systematic sampling.

From the total population, the researcher encompasses 97 households as representative by using sample determining formula, for the purpose of the study n=97, N=2912 and according to this sample the interval between each households is that  $K = \frac{2912}{97} = 30$ . The selection was based on the proportion of the total population for each kebele for the research study.

#### 3.3. Data Sources and Methods of Data Collection

In order to generate the necessary data for the research work, both primary and secondary sources of data have been used. Primary data was collected from household surveys

using structured interview, field observation, FGDs (focus group discussions), and key informant interview. In addition to aforementioned primary sources, secondary sources such as published and unpublished literatures were collected from different government offices.

#### 3.4. Methods of Data Analysis

Both qualitative and quantitative methods were used in order to analyze collected data. After collection of data, the data was categorized, coded and summarized, into numeric values and then entered to SPSS statistical program on version 20. Information obtained from structured interviews and FGDs were mostly in form of verbal information that were written down during the survey and summarized for the study. This information is more qualitative in nature and was used to triangulate during analysis. Descriptive statistics including frequency, percentage, mean and standard deviation were analyzed and summarized as well as presented in tables, graphs and figures.

### 4. Results and Discussion

#### 4.1. Background Information of the Households

Understanding the socio-economic and demographic background information about sample populations is very essential to know their characteristics. As it is mentioned above the size of sample households for the research was 97, which was taken from the three sample kebeles. From these sample population 80 (82.5%) are male respondents and 17 (17.5%) are female respondents (Table 1).

Table 1. Distributions of Households by Sex.

Sex of Households	Frequency	Percent
Male	80	82.5
Female	17	17.5
Total	97	100

Source: Field Survey, 2015.

#### 4.1.1. Educational Status of Household Heads and Family Members

According to survey four educational levels for household heads and eight educational levels for family members were identified, which include illiterate only read and write, attained primary school and attained secondary school for household heads and 0 grade, grade 1-4, grade 5-8, grade 9-10, grade 11-12, diploma, degree and above for family members. From the survey result, 54.6% of the household heads were

cannot read and write, 20.6% were only read and write, 16.5% have attained the primary school and 8.2% have attained secondary school. As the grade level increases, the number of people that attain the education is decreasing. Besides of that, about 20.1% of household family members had 0 grade, the majority of family members 152 (26.6%) were educated to a grade between 1 and 4, 24% have attained a grade between 5 and 8, 12.6% educated a grade between 9 and 10, 6.1% reached grade 11 and 12, 5.4 completed diploma program, 4.5 attained degree program and 0.3% have attained above degree program (See Table 2). The reason for the increasing of enrollments of household members at the primary school (1- 4) level is that, at current the Ethiopian government gives more emphasis for this level and built primary school at all kebeles

by considering the primary education as the right of every citizen and also it is the chief instrument for social and economic growth.

Education may increase households understanding on the causes and impacts of land degradation and the increase in the cost of rehabilitation. Education improvements appear to have contributed to several aspects of agricultural intensification and technological adoption, including fertilizers and composting, performing soil conservation measures, planting trees and fences, increase access to information, higher management expertise [3, 1]. Education would have a great influence for the awareness of farmers regarding to environmental issues and land rehabilitation process.

**Table 2.** Distribution of the Household Heads and Family Member by Educational Level.

Educational level of Household Head	Frequency	Percent	Educational level of Family Members	Frequency	Percent
Cannot read and writes	53	54.6	0 grade	115	20.1
Only read and writes	20	20.6	1-4	152	26.6
Attained primary school	16	16.5	5-8	137	24
Attained secondary school	8	8.2	9-10	72	12.6
Total	97	100	11-12	35	6.1
			Diploma	31	5.4
			Degree	26	4.5
			Above	2	0.3
			Total	570	100

Source: Field Survey, 2015.

### 4.1.2. Age Status of Household Members

Based on the field survey, the majority of populations were adulthood because of the age of population between 17 and 50 accounted for 63.6% of the total population. This age group has a positive impact for the success of the restoration program like the age of household heads in study area as the result of; they are productive age group as compared to other age groups. This study is supported by Tekilil [14] the productive age class is playing very important roles in any development activities including of land rehabilitation practices activities in the study area. The population under age of 10, 10-13, 14-16 years of age constituted 9.1%, 11.2%, and 15.9% respectively (Table 3).

**Table 3.** Age Distribution of Household Family Members.

Age group	Frequency	Percentage
Less than 10	52	9.1
10-13	64	11.2
14-16	91	15.9
17-50	363	63.6
Above	-	-
Total number HH Members	570	100

Source: Field Survey, 2015

## 4.2. Household’s Perception About Deforestation and Land Vulnerable to Degradation

**Table 4.** Households Response about the Main Causes of Deforestation and Land more Vulnerable to Degradation.

	Frequency	Percentage
The main causes for deforestation		
Fuel wood purpose	60	61.9
Building home	15	15.5
Demand for agricultural land	7	7.2
Rapid population growth	10	10.3
Settlement purpose	5	5.2
Total	97	100
Most affected by degradation land		
Livestock owners	23	23.3
Farmers	74	76.3
Total	97	100
Land vulnerable to degradation		
Private land	12	12.4
Communal land	85	87.6
Total	97	100

Source: Field Survey, 2015.

Based on the findings of study, all respondents felt that households perceived the presence of deforestation. With regard to the main cause of deforestation, the majority of the respondents (61.9%) acknowledged for fuel wood purpose and followed by building purpose, rapid population growth, demand for agricultural land and settlement purpose constituted 15.3%, 10.3%, 7.2% and 5.2% respectively (See Table 4). To overcome this problem sampled households suggested the following points based on the local context, these were creating awareness about the positive effects of forest resources and the negative impacts of deforestation at the community level, managing of forest resources in good

manner, improving agricultural production on existing farm-lands through the application of modern technology, afforestation and reforestation program with the active community participation, family planning and the application of resettlement program is vital where there is the shortage of agricultural land, using of modern technology like biogas for fuel purpose and low cost of solar energy.

It is clear that almost 76.3% of all respondents felt that the farmers is the most affected group due to the degradation of land and the same is true about the key informants because they stated that the most affected group as the result of degradation of land is all farmers and their economy is mainly based on land, whereas only 23.7% felt that the livestock owners. Among the interviewed households (87.6%) responded that the communal land is more vulnerable to the degradation. The rest 12.4% responded that the private land. Interviewed households were also requested to describe the justifications for their responses. Accordingly, those respondents who acknowledged that the communal land stated that lack of sense of ownership, most people use the communal land unwisely, overgrazing, lack of soil and water conservation measures, the community gives more emphasis to the private land, lack of management, all farmers use the communal land intensively because they consider it as the common resource and seeing one the others for conservation and protection purpose are more vulnerable to degradation of communal land.

## 4.3. The Role of Extension Services in the Restoration Process

According to survey in the study area, there was access to information to households because of all sampled households 97 (100%) opted that they have source of information to involve in the rehabilitation measures. From the total of 97 interviewed households almost all confirmed that development agents are the source of information concerning the restoration program.

Since the main agents for farmers at kebele level is DAs and it is obvious that the farmers are visited by this stakeholder at home to home level. Regarding to survey most respondents 65 acknowledged that the developments agents have visited four times per month. About 17, 10, 5 of interviewed households acknowledged three, twice and five times per month respectively (See Table 5).

**Table 5.** The Role of Extension Services Concerning Restoration of Degraded Land.

Have any source of information?	Frequency	Percent	Who gave the training?	Frequency	Percent
Yes	97	100	Agricultural office	24	24.7
No			DAs	97	100

Have any source of information?	Frequency	Percent	Who gave the training?	Frequency	Percent
Total					
Source of information			How often you have been visited by DAs within a month?		
Mass media like Radio and TV	28	28.8	Once		
Field days and training	23	23.7	Twice	10	10.4
DAs	97	100	Three	17	17.5
Neighbouring farmers	85	87.6	Four	65	67
NGOs	7	7.2	Five	5	5.1
Have you participated in training on SWC measures?			Total	97	100
Yes	91	93.8			
No	6	6.2			
Total	97	100			

Source: Field Survey, 2015.

Training plays a crucial role by developing the understanding of all stakeholders about the program and helps to involve within it without resistance to change because they gain knowledge and skill to solve the practical problems. This was similar to the finding of Yobsan B *et al* [16] delivery of training was a component of watershed management activity considered an external factor that influence the role of community participation. Sampled respondents were posed to survey questionnaire and their response is and from 152 respondents, 80% of them participated in different training and answered that their participation in different training and events such as field day, awareness creation, peer-to-peer learning, and experience sharing improved their role in the watershed. While the rest 20% did not participate in any training or event but they agreed that, it has heightened contribution to improving the role of the participating community. In addition, training enhances the awareness of the stakeholders at different levels. Based on survey, majority of households responded that the development agents are core one that most time to deliver training with regard to integrated watershed development, crop production and the like at the kebele level (FTC), community to community level and home to home visiting level as it is mentioned above. Only 24 opted that agricultural and rural development office gives training followed by development agents, but the role of NGOs in the study area in terms offering of training is as such because they are low in number and those existed once support certain selected kebeles according to key informants.

Majority of interviewed households responded that they attain the training about the soil water and conservation measures by considering that advantages that obtaining through it. Concerning training of integrated watershed development program, recently the government gives each year

for about seven days at average by the joint efforts of development agents and experts of Agriculture and Natural Resources Office. Before to launch the program evaluate plan and implementation of previous year work and finally the grade is given to model formers and the whole farmers including kebele administrators by kebele watershed committee and other stakeholders at kebele level and then proceed to the program.

Maintaining of contact with natural resource and other experts has a great role to avert land degradation through initiating households to participate in the rehabilitation process. The contact of households with experts also creates the favorable condition to obtain the updated information how to restore the degraded land in the study area. Among assessed farmers, 81.4% had contact with experts. Only 18.6% of sampled households had no contact with these experts. Based on survey in the study area, as it is showed in the table 6 most of respondents (67%) had good contact with the experts. The remaining 15.5% and 17.5% had limited and very good contacts with experts respectively. Those households that had a harmonized relationship with experts have a positive impact for rehabilitating of degraded land because they obtain the crucial information about the programme from this stakeholder and involve within it with their curiosity.

**Table 6.** Contact of the Households with Natural Resource Development and Conservation Work and Land Management Office Experts.

	Frequency	Percent
Do you have any contacts with experts?		

	Frequency	Percent
Yes	79	81.4
No	18	18.6
Total	97	100
The degree of contact with the experts		
Limited	15	15.5
Good	65	67
Very good	17	17.5
Total	97	100

Source Field Survey, 2015

#### 4.4. The Role of Stakeholders in the Rehabilitation of Degraded Land

Participatory watershed management encourages all stakeholders to jointly negotiate their interests, set priorities, evaluate alternatives, and implement and monitor outcomes as reported by Teressa Dejene [13]. Active participation and involvement of relevant stakeholders plays a pivotal role in rehabilitating of degraded land. In Ethiopia, there are a number of stakeholders that are directly or indirectly involved and play significant roles for the promotion of rehabilitating of degraded land. This is similar to the Soro Wereda and based on finding of the study the whole interviewed households responded that there are various stakeholders that involve in rehabilitation process. These are farmers, development agents; NGOs and government have its own participation in the re-

habilitation process.

Among the stakeholder government is the main actor in the Soro Wereda participated in the rehabilitation processes by harmonizing the all stakeholders for the achievement, guide and lead the program, making area that is favorable for the actors through articulating of the integrated and participatory watershed management, boosting and creating suitable condition for various stakeholders to play their roles in the rehabilitation process. Government organizations have also been involved in designing and achieving program for sustainable land management at various stages including the setting up of institutions, designing relevant policies and strategies, giving agricultural education, technology generation and dissemination [5, 8]. Most importantly, the government has instituted a decentralization policy in which the lowest levels of administration are to be engaged, with communities, in planning and implementation. In addition, policies and strategies have been formulated to enhance wise use of natural resources.

NGOs are offering training to development agents as well as to the other actors, giving necessary funding and the selected seedlings that are favorable to the community. During field observation recently the SLMP start work with the nominated kebeles based on their participation in the rehabilitation process by paying of monthly salary to the community for preparing of nursery sites to make suitable seedlings for the restoration process. Farmers have own roles in rehabilitation process by participating actively in soil and water conservation measures, giving great commitment for the success of program and show great cooperation and collaboration in the rehabilitation process.



**Figure 1.** Farmers participating in nursery management at 1st Hankota (Photo by Researcher 2015).

Giving training, participate actively in sustainable land management, follow up and guidance at the various levels, planning and implementing of the program and finally evaluate and give direction about the success of the program with

watershed committee are the roles of development agents in the rehabilitation process.

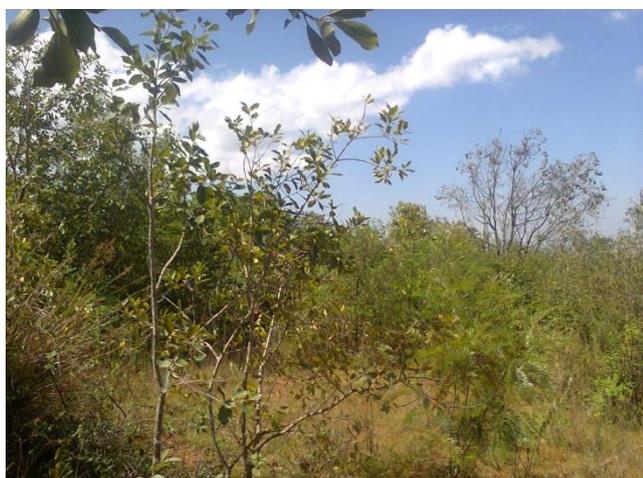
**Table 7.** The stakeholders that play role in the Rehabilitation Process and the Extent of Land Users.

Stakeholders	Frequency	Percent
Government	70	72.1
NGOs	30	31
Farmers	97	100
DAs	97	100

Source: Field Survey, 2015.

#### 4.5. The Management of Restored Land in the Study Area

Reclaiming of degraded land requires a lot of energy, capital, the participation of various stakeholders and different measures should be undertaken. However, lack of the proper management practices vulnerable to easily degradation of restored land. According to survey in the study area there are a number of management measures to rehabilitated land. As it is indicated in table 8, the major management practice to conserve the restored land is area closure because from the total of 97 sampled households all (100%) opted that area closure as the management practice and followed by this about 80 (82.5%) opted that appointment of guards for the management of reclaimed land. During the field observation in one of sampled kebele, there were two guards that protect the restored land from human and livestock interference and obtain certain income from the productive safety net programme for fulfilling of their duties. In addition, about 54.6%, 62.9% and 74.2% of interviewed households opted that punishing of criminals, cut and carry method and rotational grazing are used as other means for managing of restored land respectively on the basis of survey.



**Figure 2.** Practice of area closure as management of rehabilitated land at Shara kebele (photo by Eyasu Estefanos, 2015).

**Table 8.** Management Practices to Restored Land.

Management practices	Frequency	Percent
Area closure	97	100
Cut and carry method	61	62.9
Rotational grazing	72	74.2
Appointing guard	80	82.5
Punishing criminals	53	54.6

Source: Field Survey, 2015.

#### 4.6. Rehabilitated Watersheds in Soro Wereda Due to Restoration Process

Based on reviewed document from agricultural and development office and as it is showed in table 9 there is the increasing of trend of rehabilitation year to year. At the beginning there is a slow progress about the programme because the programme that adopted earlier was top-down planning and this condition discourages the stakeholders in the rehabilitating of degraded watersheds. However, in the year of 2010 in the study area there is a milestone about the restoring of degraded watersheds because in the study area the government initiates the local community to engage in the community based participatory watershed development and followed by this they plant trees, apply soil and water conservation measures and the like, about 12% of watershed is rehabilitated in 2011 and as compared to 2011 in 2012, 2013 and 2014 the rehabilitated watersheds are showing the improvement because it contains 27.5%, 28.5% and 31.9% respectively.



**Figure 3.** Rehabilitated Watershed at Hirche Uyaya Kebele in Soro Wereda through participatory community based watershed management practices (photo by Researcher, 2015).

Numerous extension services are delivered regarding to community based participatory watershed development and the government also gives the media coverage at the country level to encourage rural community, development agents and non-governmental organizations to participate in the rehabilitation process. There is an increment of stakeholders year to year because they are aware about the programme and the

wereda agricultural and rural development office put the rank for each kebele by classifying them in to three categories based on the implementation of the rehabilitation process. These are higher achiever, middle achiever and low achiever and the agricultural and rural development office finally gives guidance and support in order to show the progress for those find at middle and low level in terms of implementation.

**Table 9.** Rehabilitated Watersheds in Hectare and Percent in the study area.

Year	2011	2012	2013	2014	Total
Restored land in hectare	3200	7380	7665	8560	26805
Restored land in Percent	12	27.5	28.5	31.9	100

Source: Soro Wereda Agricultural and Rural Development Office, 2015.

## 5. Conclusions and Recommendations

This study has attempted to assess the roles of stakeholders in land rehabilitation measures and its management practices: The Case of Soro Wereda, Hadiya Zone, Central Ethiopia. In the study area productive safety net programme gives incentives for rural community in two forms, these are direct support and public support. The direct support is the incentives that is given to elders and disable persons based on family member whereas the public support is given based on family member as the result of households give labor services such as for participating of, in soil and water conservation measures, rural road construction and preparing of nursery sites.

Reclaiming of degraded land requires a lot of energy, capital, the participation of various stakeholders and different measures should be undertaken. However, lack of the proper management practices vulnerable to easily degradation of restored land. Training plays a crucial role by developing the understanding of all stakeholders about the program and helps to involve within it without resistance to change because they gain knowledge and skill to solve the practical problems. In addition, training enhances the awareness of the stakeholders at different levels.

Active participation and involvement stakeholders are very crucial to reclaim the degraded land and rehabilitation process. There is an increment of stakeholders year to year because they are aware about the programme and the wereda agricultural and rural development office put the rank for each kebele by classifying them in to three categories based on the implementation of the rehabilitation process. These are higher achiever, middle achiever and low achiever and the agricultural and rural development office finally gives guidance and support in order to show the progress for those find at middle and low level in terms of implementation.

The contact of households with experts creates the favora-

ble condition to obtain the updated information how to restore the degraded land and manage rehabilitated land in the study area. Among assessed farmers, 81.4% had contact with experts.

Communal land faced lack of sense of ownership, most people use the communal land unwisely, overgrazing, lack of soil and water conservation measures, the community gives more emphasis to the private land, lack of management, all farmers use the communal land intensively because they consider it as the common resource and seeing one the others for conservation and protection purpose are more vulnerable to degradation of communal land.

Based on the nature and finding of the study, the following intervention measures are recommend;

1. By kebele watershed committee and other stakeholders at kebele level before to launch the program evaluate plan and implementation of previous year work and finally the grade should be given to model farmers and the whole farmers including kebele administrators.
2. Joint efforts at wereda level is necessary to further promote land rehabilitation process and integration among various disciplines and initiates working together to successfully implement various soil and water conservation practices.
3. To maximize the yield of the farmland focus should be given to farming system and sustainable land management practices to increase production from small farm land, because of increase in production and productivity of agricultural land speedup the rehabilitation process.
4. Extension services should create mechanisms to boost the understanding capacity of households about management of reclaim land and roles of various stakeholders in the rehabilitation process and sustainable land management practices. The participation of different stakeholders during soil and water conservation practices, strategy development, policy formulation and

technology selection to sustainable land management practices will help to identify the interests of the different stakeholders and to choose more relevant sustainable land management practices. Sustainable land management practices in the Soro Wereda can be further promoted if they are carried out through participatory integrated watershed management practices.

5. Involvement in on-farm activities is the most significant factor that influences in rehabilitation process. Such farmers need to be supported so that they can make decision to invest on conservation measures. Furthermore, the agricultural sector has to be made more attractive so that farmers can invest more on conservation based agriculture.

## Abbreviations

DAs	Development Agents
FGD	Focus Group Discussion
FTC	Farmers Training Center
ha	Hectare
NGOs	Nongovernmental Organizations
SLMP	Sustainable Land Management Project
SPSS	Statistical Package for Social Sciences

## Acknowledgements

The author would like to thank Soro Wereda Finance and Economic Development Office and Agricultural and Rural Development office experts for their numerous supports during data collection.

## Author Contributions

Eyasu Estefanos Shanko is the sole author. The author read and approved the final manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

- [1] Baidu-Forson. J. (1999). Factor influencing adoption of Land enhancing technology in the Sahel: Lessons from a case study in Niger. *Agricultural Economics, Institutes for Natural Resources in Africa*, Accra, Ghana. 231-239.
- [2] Dessalew S (2022) Cause of Land Degradation and Rehabilitation Practices in Case of Amba Sidist Western Ethiopia *American Journal of Chemistry and Pharmacy (AJCP) Volume 1 Issue 1, Year 2022*.
- [3] Ervin. C. A. and Ervin. E. D. (1982). Factors affecting the use of Soil Conservation Practices: Hypothesis, Evidence and Policy Implications: *land Economics* 58(3): 277-252.
- [4] Elias B Opportunities and Challenges of Rehabilitation of Degraded Land in the Case of Offa Woreda, Wolaita Zone, Ethiopia. *Texas Journal of Multidisciplinary Studies ISSN NO: 2770-0003* <https://zienjournals.com> Date of Publication: 18-09-2021.
- [5] Gete. Z, Menale. K, J. Pender and Mahmud. Y. (2006). Stakeholder Analysis for Sustainable land Management in Ethiopia: Assessment of Opportunities, Strategic Constraints, Information Needs, and Knowledge Gaps.
- [6] Israel. D. G. (2012). Determining Sample Size, University of Florida, USA. Pd006. <http://edis.Uf.edu/> Accessed on September 2, 2012.
- [7] Kibemo. D. (2011). Farmers Perception on Soil Erosion and Their use of Structural Soil Conservation Measures in Soro District, Southern Ethiopia (MA Thesis), Addis Ababa University, Addis Ababa, Ethiopia.
- [8] MOARD & WB. (2007). Thematic Papers on Land Degradation in Ethiopia. Addis Ababa, Ethiopia.
- [9] Mulugeta. L. (2004). Effects of land use change on soil quality and native flora degradation and restoration in the highlands of Ethiopia. Implication for sustainable land management. (Ph.D Thesis). Swedish University of Agriculture Science, Uppsala, Sweden.
- [10] Ravera. O. (1989). Ecological assessment of environmental degradation, pollution and recovery. Elsevier Science Publishers. New York.
- [11] SWANRDO (Soro Woreda Agriculture and Natural Resource Development Office) Unpublished Annual Report of (2015).
- [12] Soro Wereda Finance and Economic Development Office. (2014). Total Household sizes in each Kebele Administration of Soro Wereda.
- [13] Teressa D (2018) Community participation on watershed management program: the case of Gemechis District, Oromia, Ethiopia. *Int J Compr Res Biol Sci* 5(9): 7–18.
- [14] Tekilil W (2021) Opportunities and Challenges of Rehabilitating Degraded Land in the Case of Cheha Woreda, Gurage Zone, SNNP Region, Ethiopia *Research in Ecology | Volume 03 | Issue 03 | September 2021*.
- [15] Woldeamlak. B. (2003). Towards Integrated Watershed Management in Highland Ethiopia the Chemoga Watershed case Study. *Tropical Resource Management*. Paper, No 44 | 2003.
- [16] Yobsan B, Birhanu K and Tolera K (2023) Assessing the role of community participation in integrated watershed management in Dandi Lake watershed Dandi district, West Showa, Oromia, *Ethiopia Applied Water Science* (2023) 13: 207 <https://doi.org/10.1007/s13201-023-02009-x>