

Community Perception on Land Degradation Problems and Management Practices in Begi Woreda, Oromia Regional State, Ethiopia

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Abstract

In Begi Woreda land degradation became an ecological and agricultural productivity problem. To overcome this problem different land management practices such as soil and water conservation practices implemented through community mobilization. Therefore, this study assessed community perception on land degradation problems and its management practices in Begi Woreda. Randomly, 110 respondents selected using survey, focus group discussion with community and field observation was employed to generate the data. The result indicated that communities were acknowledged the prevalence of land degradation (89.5%) and affecting their livelihoods while 10.5% of respondents replied there is no land degradation problem on their plot of land. Respondents repeatedly mentioned causes of land degradation in the Begi Woreda were 78.3% uncontrolled grazing, 81.2% population pressure and intensive cultivation, 79.6% deforestation, 65.1% inappropriate conservation practices, 64.7% topographic nature of land, 62.8% indigenous farming practices and 48.4% land fragmentation. Therefore, majority of respondents agreed that land management practices are important to minimize the rate of land degradation. This reflected respondents had good perception towards the importance of land management practices. According to the survey results soil bund, fanyajuu, cutoff drain, check dam, trenches and eyebrow, area enclosure, agroforestry practices and grasses with and without physical soil and water conservation structures were common practices in the Begi Woreda. Most of respondents replied we need technical support and close contact with different stakeholders for experience sharing. Community believed practice was benefit based and site specific. In conclusion, consideration for land management practices not only for the study area also for the other parts of Ethiopia at great through identifying and integrating technical as well as site specific and benefit based land management practices help to benefit and cope degradation hence increase benefits obtained from the practice.

Keywords

Community Perception, Land Degradation, Land Management Practices

1. Introduction

In Ethiopia land degradation in the form of soil erosion and declining fertility is serious challenge to agricultural productivity and economic growth [15]. Natural resource and the benefits they provide in the form of income, food, and watershed protection have no options and have critical role in enabling peoples to have stable and adequate food supply [6]. Therefore, natural resource degradation is severely reducing

the capacity of natural resource to contribute for food security and other benefits, such as fodder and fuel wood in Ethiopia [6, 20]. Alarming rate of population increase, more demand for food and expansion of settlement resulting deforestation for expansion of agriculture, construction materials, fuel wood, and overgrazing [10, 26]. Natural resource degradation and resulted in reducing productivity, has increased poverty and food insecurity [9, 23]. Natural resource degradation is the major environmental problems resulting for decline of agricultural productivity [20]. The

average rate of soil erosion in the country wide was estimated at $12 \text{ t ha}^{-1} \text{ yr}^{-1}$, giving a total annual soil loss of 1,493Mt. The severity is much higher in agricultural land, in which 85% of the total population depends on it to get their survival [3].

A sustainable, effective and efficient method against erosion is an integral component of natural resource management to achieve productive agriculture, food security and restoration of ecology [17, 19]. To protect the livelihoods of rural peoples which are experienced fragile ecosystems, resource degradation, and loss of fertile soil and stress of soil moisture, land management practices has been convinced as strategy. It used to secure availability of water for domestic use, livestock, and irrigation, increasing fodder for their livestock, diversifying income and employment opportunity for households and landless through enhancing the productivity of agriculture in general [2, 12].

To achieve food security and environmental rehabilitation, the government of Ethiopia has been implemented different land management practices in many parts of the Ethiopia including Begi Woreda in Oromia regional state. Integrated soil and water conservation measures have been practiced since in the early 1990s through community mobilization and Safety Net Program during Plan for Accelerated and Sustainable Development to End Poverty and currently Growth and Transformation Plan.

Although, wonderful efforts has been made by the government of Ethiopia to reduce environmental degradation, still serious threat in achieving sustainable agricultural growth and stable economic development [18]. In Ethiopia, most of the time farmers are enforced to participate in the conservation activity without any clear identification and priority needs of them [17, 5].

Land resource degradation is closely related to the interests of farmers, so proper identification of degradation prone area and site specific natural resource management techniques is the interests of the users [1]. Awareness and familiarity of

farmers about land resource degradation is the determinant social factor which is important in deciding the options to restrain the losses. Taking into account, community understanding and land management practice is unquestionable and effective mechanism for the sustainable implementation of land management activities [8]. Identifying site specific problems with integrating local understanding and available raw materials is the major components of successful land management practices in sustainable way [11]. Accordingly, without recognizing how communities are makes a decision to use their land, degradation problem and land management practices cannot be stated [13]. Therefore, this study examined community perception on land degradation problems and its management practices in *Begi Woreda* in Oromia regional state.

2. Materials and Methods

2.1. Research Site

The study was conducted in Begi Woreda which is located in Mirab Welega Zone of Oromia region, south western Ethiopia, covering an area of $2,522.50 \text{ km}^2$, with an average altitude of 1673ma.s.l. Begi Woreda is bordered on the south by Kelem Welega Zone, on the west and north by the Benshangul-Gumuz Region, on the northeast by Mana Sibu, and on the east by Jarso. It is geographically located at $9^{\circ}14'60''\text{N}$ latitude and $34^{\circ}44'99''\text{E}$ longitude (Figure 1). The average temperature of the area is 17.8°C per annum, with mean annual rainfall of 1278mm, even though the area receives dual rainfall, most of the time it is highly concentrated in July, August and September. Most of the farmers in the study area were able to identify the soil in their area based on its color as red soil and black soil and based on texture, as loam and sandy. The scientific classification of soil types in the study area were *litosols*, *vertisols*, *luvisols*, and *cambisols* [7].

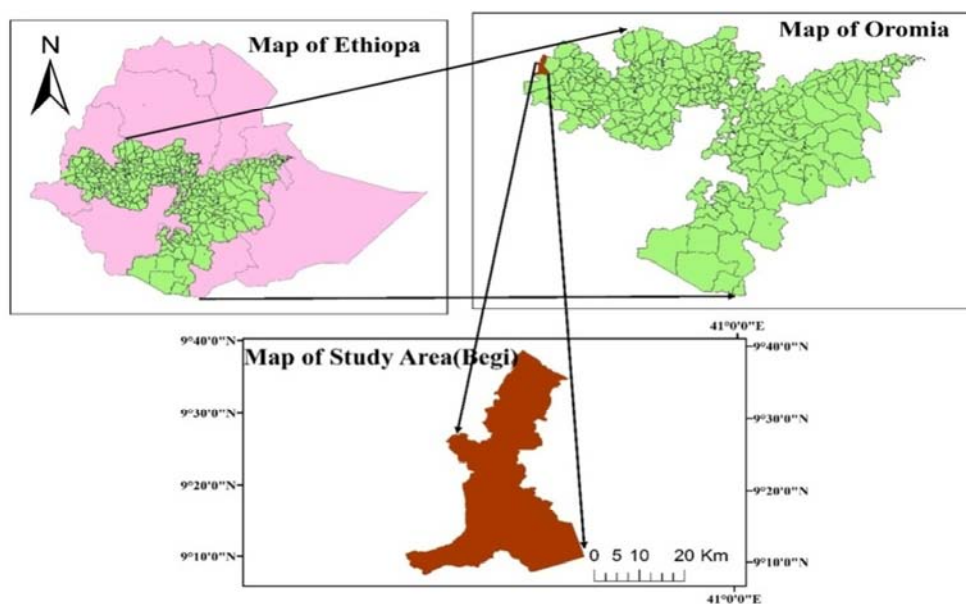


Figure 1. Map of Study Area.

The farming system is characterized mixed crop- livestock system on a subsistence scale in which majority of the population live. Commonly growing crops in the area are Teff, wheat, maize, and chick peas. Coffee is a major cash crop and cattle and sheep are the dominant types of livestock. Since the farming system is depending on rain-fed system, therefore, communities are always concerned about the duration and concentration of rainfall [7].

2.2. Data Collection and Analysis

Various land management practice was started in different parts of the Ethiopia including Begi Woreda. On the basis of severity of the land degradation problems, Begi Woreda was purposively selected for the study. With the list, a random sampling technique was used to select a total of 110 sample respondents. Primarily, questionnaire was prepared for quantitative information then interview was done with selected respondents while they were doing community based land management activities. Supplementary information was obtained through informal discussion at the same time community based land management practices implementation undertaken. Structure questionnaires were comprised both open and closed ended questions. The issues included in the questionnaires were community observation of land degradation, and its management practices and willingness to continue land management practice. After having this information, the entire relevant information was analyzed using SPSS version 20 then, described by using descriptive statistics such as frequency, tables and figures. Based on the result, perception of communities on land degradation and its management practices was assessed in the study area.

3. Result and Discussion

To understand the community perception on land degradation and its management practices in the study area, 110 respondents were interviewed and analyzed information was presented in the following sub-topics.

3.1. Respondents Characteristics

As presented in the following Table 1, the age of respondents lied between 20 to 49 years was 75%, and only 25% of respondent ages lied above 50 years in the study area with average of 41 years. The survey result confirmed that 88.3% of the respondents were male, the dominance on male respondents revealed that they were dominant in the participation of land management activities such as different soil and water conservation activities. Whereas, 11.7% of respondents were females. With regarding to family size of the respondents about 49.6% respondents has family size between 0 to 6 in number and about 50.4% respondents replied they have more than seven family members. The majority of respondents in the *Begi Woreda* were married (85.9%). Whereas, among interviewed respondents about

14.1% of respondents were single.

With regarding educational status of study area about 50.9% of respondents were literate and about 49.1% of respondents were illiterates (Table 1). The key informants in the study area reported as educated farmers have a good perception on land degradation and its management practices than non educated farmers because of educated farmers better recognize the risk associated with land degradation problems and hence tend to use appropriate measure on their farm plots. Moreover, they have a tendency of not using marginal lands located on sloppy areas which need check dam for cultivation. Similarly, [24] reported that a unit increases in education increases the probability that farmers will use improved land management practices.

Table 1. Respondents Characteristics.

Respondents characteristics		Respondents proportion in (%)
Gender	Male	88.3
	female	11.7
Age (year)	20- 49	75
	≥50	25
Marital status	Single	14.1
	Married	85.9
Family size(number)	0 to 6	49.6
	≥7	50.4
Educational status	Illiterate	49.1
	Literate	50.9
Land size (ha)	<0.5	53.6
	0.5 to 2	38.3
	≥2	8.1

On the other hand, among interviewed respondents about 53.6% of respondents have land size <0.5 hectare, about 38.3% respondents have land size between 0.5 to 2 hectare and about 8.1% of respondents have with land size of ≤2 hectare (Table 1). Communities repeatedly reported we have small size of land when compared with family members we have. Therefore, we use a piece of land intensively for cultivation without following brought land degradation in the Woreda. Land is the most important natural resource for achieving the aim of national food security and economic development in general, the study *Woreda* in particular.

3.2. Community Perception of Land Degradation Problems in Study Area

As indicated in Table 2, about 89.5% of the respondents acknowledged the occurrence of land degradation which contributed negatively for the health of their land in particular, for agricultural productivity in broad. Also they reflect due to soil loss from farm fields decreased the thickness of top soil and hence crop yield declined. Whereas, 10.5% respondents replied there is no land degradation problem on their plot of land.

On the other hand, respondents indicated the causes for land degradation were replied 78.3% uncontrolled grazing, 81.2% of respondents replied population pressure and intensive cultivation, 79.6% of respondents were replied deforestation, 65.1% inappropriate conservation practices,

64.7% topographic nature of land, 62.8% indigenous farming practices and 48.4% of respondents replied land fragmentation were repeatedly mentioned, as a serious cause for accelerated natural resource degradation (Table 2).

On contrary to this, among interviewed respondents 21.7%, 18.8%, 34.9%, 20.4%, 35.3%, 51.6% and 37.2% were reported the following factors as not a causes of land degradation such as uncontrolled grazing, population pressure and intensive cultivation, inappropriate conservation practices, deforestation, topographic nature of land, land fragmentation and indigenous farming practices respectively (Table 2).

Even though communities were perceived land degradation as a problem of their farm land, the level of understanding about the severity of the problem was confined mostly to gully formation. As can be observed from the field, rill and gully erosion caused for decline in productivity and could influence their participation in the conservation activities (Table 2). This was in line with [22] deforestation, unsustainable farming practice, and alarming rate of population growth put a great pressure on natural resource. The relationship between increasing number of population and fixed quantity of land resources make confronting the Ethiopia and underline for the difficulty of securing food for their survival.

Table 2. Community perception of land degradation, causes and indicators.

Assessing variables of land degradation	Respondents proportion in (%)	
	Yes	No
Land degradation problem on your farm	89.5	10.5
Causes for land degradation		
Uncontrolled grazing	78.3	21.7
Population pressure and intensive cultivation	81.2	18.8
Inappropriate conservation practices	65.1	34.9
Deforestation	79.6	20.4
Topographic nature of land	64.7	35.3
Land fragmentation	48.4	51.6
Indigenous farming practices	62.8	37.2
Indicators of land degradation		
Reduction of yield	92.3	7.7
Formation of rills and gullies	98.8	1.2
Decrease soil depth	76.4	23.6
Soil color change	79.6	20.4

With regarding to indicators of land degradation, respondents were reported as 92.3% yield reduction and poor crop performance, 98.8% formation of rills and gullies, 76.4% decrease soil depth and 79.6% soil color change. While among interviewed respondents, 7.7%, 1.2%, 23.6% and 20.4% were has no understanding on indicators of land degradation such as reduction yield, formation of rill and gullies, decrease of soil depth and soil color change respectively (Table 2). Rill formation, removal of top soil by runoff and poor water holding capacity of soil was less believed to be an indicator for the occurrence of natural resource degradation. Currently, farmers also noticed that natural resource has become more vulnerable to erosion because of intensive cultivation without fallowing due to high population pressure. A study in Chemoga watershed by

[25] reported that when farmers were asked to describe their indicators of soil erosion, they stated gully/rill formation, landslides, wash away of crops and siltation of the soil. These are land traits that appear in a much later stage of land degradation, after the soil organic matter and nutrients of the soil are removed. Similarly, farmers' indicators of land productivity decline include yellowing of crops, weed infestation, and change of soil color to red or Grey, traits that appear at the later phase of soil fertility decline

As shown in the following Figure 2, there is a huge gully formation, soil color change and soil depth decrease. All of these are indicators of land degradation in Begi Woreda



Figure 2. (A) degraded grazing land and (B) degraded cropping land in Begi Woreda.

3.3. Perception of Community on Land Management Practices

Understanding community perception of land degradation and its impact is important in promoting soil and water conservation practices. Land degradation is a menacing and slow process therefore communities need to perceive its severity and the associated yield loss before they can consider implementing soil and water conservation practices. Likewise, understanding of farmers' knowledge and their perception of factors that influence their land management practice is of paramount important for promoting sustainable land management [21]. It is also interesting to know if and when farmers practice what they know and perceive.

Respondents were asked to answer over the benefit of land management practice, 85.6% from interviewed respondents were replied they were recognized the benefits of land management practice, whereas, 14.4% didn't recognized the benefit of community based land management practice (Table 3). Even though, the majority of interviewed respondents (72.4%) were participated in the land management practices such as different soil and water conservation practices whereas, 27.6% of respondents didn't implement the practices on their own plot of land. The reason might be shortage of farm size, lack awareness and other unknown personal reasons. As revealed by focus group participants, farmers who cultivated their own land implement biological soil and water conservation as compared to those who rented or cultivated land for share crop.

On the other hand, 86.8% from all respondents use

extension agent as a driver to participate in land management practices and only 4.6% were participated with their conviction and 8.6% were food-for work used as a means for their participation in the activity (Table 3). In this study extension services was taken especially in terms of services like extension contents and message on land management activities rather than a mere contacts of development agents with farmers. The more the farmers gain important message and contents on land management, they become more initiated to do conservation activities and they also become more interested to invest on land management activities [14, 16]. This also will help farmers to be aware of the importance of soil erosion problem. Therefore; it is expected to have a positive relation with farmers' decision on conservation strategies of land management.

Designing rules on the basis of farmer's knowledge, the demand they need and integrating with the available local row materials could have huge contribution for the sustainability of implemented community based land management practices. From the surveyed respondents, 67.6% respondents replied government provides a rule which was very important for effectively managing and rehabilitating their plot of lands. As well as, a rule designed by the communities themselves was only 34.8% of respondents was assumed to be participated in the design of rules. Also the communities interviewed on the reason why they did not implement land management practices on their own land, out of interviewed farmers, 67.6% replied due to shortage of land, 20.6% due lack of awareness and 10.9% replied due to unmentioned reasons (Table 3)

Table 3. Perception of respondents on land management practices.

Perception of respondents on land management practices	Respondents in (%)	
	Yes	No
Understanding benefits of land management practices	85.6	14.4
Implementing of land management practices on own farm	72.4	27.6
Land management practices are initiated through		
Myself	4.6	-
Development agent	86.8	-
Food for work/incentive based	8.6	-
Reason why not involve in land management practices		
Shortage of land	67.6	-
Lack of awareness	20.6	-
Other reason	10.9	-
Responsibility to design land management practices		
Ourselves	32.4	-
Government bodies	67.6	-
Willingness to accept land management practices	93.7	6.3
Is practice benefit based?	62.7	37.3

As presented in Table 3 above, 93.7% of all interviewed respondents willing to accept land management practices, 6.3% were not willing to accept and continue the conservation activities. The reason might be lack of awareness and other personal reasons.

On the other hand, 62.7% of respondents were replied as land management practices are benefit based technologies and it helps to achieve a sustainable developmental goals whereas, 37.3% of respondents did not understand benefits of land management practices in well manner.

3.4. Land Management Practices in the Study Area

As presented in the Table 4 below, majority of respondents agreed that land management practices are important to minimize the rate of land degradation on their plot of farm and communal grazing lands. This showed that communities had good perception towards the importance of land management practices on their farm and communal grazing lands. According to the survey results there are various land management practices applied by communities on their own farm plots and grazing lands to minimize land degradation

problems in the study areas. For instance; soil bund, fanyajuu, cutoff drain, check dam, trenches and eyebrow, area enclosure, agroforestry practices and grasses with and without physical soil and water conservation structures (Table 5). During field observation researcher observed among land management practices soil bund and fanyajuu are widely practiced by communities on their crop lands in the *Begi Woreda*.

Whereas, eyebrow and trenches are widely implemented on degraded grazing lands in the study area. Some of the respondents expressed, implementation and participation of different land management practices were undertaken against their will, development agents were taken the lead to enforce and impose punishment for not being participated in conservation activities. The primary reason for this was not lack of awareness about problem of land degradation and shortage of farm size, but some of the revealed feeling of possession uncertainty. They repeatedly pointed out if once community based land management practices were implemented in their land they feel that losing and belongs to a communal land. The following land management practices were common in the study areas

Table 6. Types of land management practices in the Begi Woreda.

Types of land management practices	Proportion of respondents in (%)	
	Yes	No
Soil bund	91.7	8.3
Fanyajuu	87.6	12.4
Cutoff drain	51.2	48.8
Check dam	57.3	42.7
Water ways	51.4	48.6
Trenches and eye brow	59.8	40.2
Area exclosure	52.5	47.5
Agroforestry practices	60.5	39.5
Grass with and without physical structures	69.1	30.9

As shown in the Figure 3 below, to overcome land degradation problems different land management practices were implemented through community mobilization in Begi Woreda

**Figure 4.** Community implementing physical soil and water conservation measures in Begi Woreda.

3.5. Rating of Land Degradation and Its Productivity Change over Time in Study Area

With regarding to the rate of prevailing land degradation problem over time, even though difficult for communities to differentiate the trend of natural resource problems and decrease in productiveness of land, about 67.6% respondents believed to be moderate, crowd implementation of different land management practice contributed for the curbing of the problem and following the practice the hazard has become minor (26.4%). Whereas, about 4% respondents believed the rate after land management intervention was severe and 2% respondent believed unchanged (Table 7). Land productivity was one of the determinants of agricultural productions in the Begi Woreda. According to Table 8, over 92% of the interviewed farmers observed land productivity on their farm fields after intervention measure increased, about 6.8% respondents reported as decreased and only 1.1% respondents didn't observe any change on their farm plots. About 77.6% respondents reported indicator of land productivity reduction was yield decline, 16.4% required high input demand and 6% replied soil color change (Table 9).

Table 10. Community perception on land degradation and productivity change over time.

Perception of respondents on		Respondents (%)
Land degradation after land management practices	Severe	4
	Moderate	67.6
	Minor	26.4
	Unchanged	2
Land productivity after management practices	Increasing	92.1
	Decreasing	6.8
	Unchanged	1.1
Indicator of land productivity decline	Yield decline	77.6
	Soil color change	6
	Increased input demand	16.4
	Use of manure	11
Mechanisms of improving land productivity	Fallowing	20
	Use of chemical fertilizer	17.5
	Crop rotation	30.3
	Mulching	21.2

As shown in the above Table 11, the interviewed respondents about the mechanisms of improving land productivity, they replied crop rotation (30%), mulching (21.2%), fallowing (20%), use of chemical fertilizers (17.5%) and use of manure (11%). This land management practices improve soil organic matter in well manner.

4. Conclusion

Based on the above findings, land degradation is a threat to the economic development of Ethiopia in general and in Begi Woreda in particular. As communities are dependent on the agricultural sector for their livelihood, assessing their perception on land degradation and its management practices has become very considerable. Regarding this, the researcher analyzed the community perception on land degradation problem, causes and their management practices.

During the discussion, perception of communities on the causes of land degradation were very recognizable from the finding as communities of the study area understood that some of the main causes of land degradation problems perceived by respondents were uncontrolled grazing, population pressure and intensive cultivation, deforestation, inappropriate conservation practices, topographic nature of land, indigenous farming practices and land fragmentation.

With regarding to indicators of land degradation, respondents were reported as 92.3% yield reduction and poor crop performance, 98.8% formation of rills and gullies, 76.4% decrease soil depth and 79.6% soil color change. While among interviewed respondents, 7.7%, 1.2%, 23.6% and 20.4% were has no understanding on indicators of land degradation such as reduction yield, formation of rill and gullies, decrease of soil depth and soil color change respectively. Currently, community also noticed that natural resource has become more vulnerable to erosion because of intensive cultivation without fallowing due to high population pressure. The study identified that communities of the study area applied various land management practices such as soil bund, fanyaju, cutoff drain, check dam, trenches and eyebrow, area enclosure, agroforestry practices and grasses with and without physical soil and water conservation structures were common practices. As stated by key informants, community uses manure, crop rotation, and chemical fertilizers to improve land productivity. Also this finding reflected, community required technical support and close contact with different stakeholders for experience sharing. Community believed the practice was benefit based and site specific. The communities have good perception of land degradation and its management practices but degradation is not one time process. Therefore, continuous practice of appropriate land management technology will be better to reduce rate of land degradation and improve community livelihood in the study area. Depending on the results, the following recommendations were suggested

Recommendation

Based on the findings of this study, the following recommendations were forwarded:

For the successful implementation of the practices, community awareness about long and short term benefit obtained from practices on the one hand and long and short term consequence of land degradation problem on the other are critical. The concerned officials must recognize the reason why community not willing to continue and adopt management practice sustainably and acknowledge and support the native knowledge and technologies. In addition, so as to maximize the compatibility as well as the adaptability of designed land management practices, clearly identification of community perception and ground situation will help to achieve a sustainable environment.

Motivating communities, empowering them in planning and designing land management policies and strategies is the critical factor for the implementation and expansion successful practice and selecting the appropriate technology on the basis of benefit, and existing socio-economic circumstance. Reflection for land management practices not only for the study area also for the other parts of Ethiopia at large through identifying and integrating technical as well as site specific and benefit based land management practices help to benefit and cope degradation hence increase benefits

obtained from the practice. Taking these issues in to account will help for disseminating of successful land management practices to end users will improve the livelihoods of the communities.

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