Farmers' Awareness about Land Degradation and their Attitude towards Land Management Practice in Gozman district, North west Ethiopia

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Abstract:

The main objective of this study is to assess the awareness level of farmers 'about the cause and consequence as well as response to land degradation. It also examined the determinant variables which affect farmers' awareness and response to land degradation in Gozamin district, Amhara region. The basic data used in this empirical study obtained from a survey of 130 sample household through questionnaire, interview & FGD. Descriptive statistics together with Chi-square test were used to analyze the data.

98% of the respondents were aware about the existing land degradation problem & the major causes as identified by the respondents were over cultivation (90%), soil erosion (89%), deforestation and overgrazing (82%).on the other hand, reduction of agricultural crop yield (90%), livestock product reduction (83%), landlessness (73%) and poverty & dependency (72%) were recognized as the principal consequences of land degradation.

Contour plowing (90%), terracing (84%), making water way (67%), crop rotation, tree Planting (62%), enclosure of grazing land (60%),mulching with the addition of compost(53%),agro forestry (50%),mixed cropping and tree planting were the different land management practice in the study area.

The chi square test of the data indicated that there is a significant association between farmers' awareness and response with

the impact of demographic and socio-economic characteristics on land degradation and management practices.

Based on this, there is positively and significantly association with age, literacy status, farm size and house hold income. However, house hold size did indicate significant association with the awareness of land degradation. Regarding to farmers' response to application of different management measures, the test showed that there is positive and significant association between age, household size, literacy status and family income with land management practices but not with farm size.

Based on the finding of this empirical study at household level, all concerned bodies such as governmental ,NGOs' and the farmers should give emphases for those factors which critically affecting the existing land resource and the management practices that should be taken by raising the awareness level of farmers through formal and informal training.

Key words: Awareness, land, degradation, management practice, North West Ethiopia

1. INTRODUCTION

Background of the Study

Land degradation is one of the major environmental and serious problems in the world with its most severe negative implication on the rural communities annually $42 billion income and 6 million hectare of land are lost globally due to land degradation [13]. It is one of the causes for the decline in agricultural production and a major constraint to agricultural development [5].

Due to land degradation in most developing countries, in particular, agricultural productivity showed a dramatic decline and reached the level beyond the subsistence requirement of a household [3].The problem is more diverse in Africa; where 43% of the land is affected by land degradation ranging from

moderately to severely due to human activities and it threats millions of people by starvation [16]. Yield reduction in Africa [11] due to land degradation which is mainly caused by past soil erosion may range from 2 to 40% with a mean loss of 8.2% for the continent.

Over large areas of the Ethiopian highlands, there is easily observable land degradation. Land degradation in turn has contributed to the reduction of yield and at times to a complete loss of land productivity and human suffering in the highlands of the country where over 95% of the regularly cropped lands of the country are known to exist. Since the country's development is totally dependent on its land resources, the loss of productivity due to degradation has serious implication on social and economic development endeavors [13].

The heavy dependence of people's livelihoods on agriculture and inappropriate use of natural resources resulted in fast and vast land degradation [7]. This in turn resulted in impoverishment of both ground and surface water largely impedes socio-economic development [8]. The country is indeed in dilemma of producing enough food for its rapidly growing population on the one hand, and protecting the resource base upon which this is dependent on the other hand. Failure of Ethiopian agriculture to feed the population is partly resulted from cumulative effect of land degradation mainly in the highland part of the country [17].According to [12], maintaining a sustainable balance between these issues becomes also a major challenge for it.

Like other parts of the country population pressure and overgrazing are identified as the main factors of land degradation presently observed in the Amhara Regional State. Excessive deforestation often as function of growing demand for fuel wood and cultivation land have had another equally

significant implication on the soil erosion, land degradation and disturbance in hydrologic regime[15].

The Central Statistics Agency Agricultural Survey (1998) cited in [3] indicates that in 1997/98 there were 9.3 million agricultural households in the country, of which 6.4 million had 4 to 9 family members, 6.9 million (74%) were illiterate, and 86% had a land holding of 0.01 to 2 hectares of these 8.3 million (89%) were found in Amhara, Oromia and SNNP regions. The figure vividly shows us the source of land fragmentation as they related to household size, the problem associated with lack of education and low awareness level and the problems related to soil and land management, given heavily fragmented subsistence holdings[3].

Farmers' decisions to conserve natural resources generally and land (soil) and water particularly are largely determined by their knowledge of the problems and perceived benefits of conservation [1]. The responses, commitment and responsibilities required for the success of formulation of appropriate resource management policies depend on perception of the problem by small holder farmer [4].

Thus land degradation due to erosion and conservation cannot be understood without studying how people use the land and the reasoning that guides their decision about land use [7].

The study area is found in North West central highland part of the country. It is one of the districts in Amhra regional state. As it is known most highland parts of the country are exposed to what we call land degradation due to their topographic arrangements (soil erosion) and other socio-economic factors.

It is obvious that there is a lot of natural resource degradation problem in rural areas, but the research is mainly concentrated on the study area's land degradation problem. Hence the study is intended to see or assess farmers' awareness about land degradation & their attitude towards different land

management practices which has a direct or indirect relation or impact on soil fertility, productivity and above all sustainability.

2. MATERIALS AND METHODS

2.1 Description of the Study Area

The study area entirely lies within East Gojjam zone around Debre Markos town, the capital of East Gojjam Zone, in the Amhara regional state. Astronomically, the area under consideration is located between 10'2"N-10'8"N latitude and 37'3"-37'1"E longitude respectively. Since the district has no its own capital, the administrative unit is found in Debre Markos town which is located at a distance of 300km far from the capital of the country, Addis Ababa & 265 km from the capital of the region, Bihar Dar [10].

The study site covers a total area of 1,173.80sq.km with a crude population density of 113.21, persons per sq.km. This is very high as compared to the national crude density which is 54.4 persons per sq km. This indicates that the presence of high population pressure in the area under consideration [6]. The temperature distribution of the study area is mainly a reflection of elevation. According to the regional meteorological data, the study area comprises varied thermal zones ranging from 'kolla' (Tropical) to 'Dega (Cold zone). The majority part of the district is classified under wiona Dega(sub-tropical) (74%) agro climatic zone whereas Dega and kola accounts nine percent for each(9%).The remaining part of the district is classified under wurch (frigid) which is the smallest portion as compare to the others i.e. 1%.The study area falls within the summer rainfall regime. The district receives a mean annual rainfall that varies from 1448-1808mm.The mean annual amount temperature for the study area ranges from 11oc-25oc.

According to FAO/UNDP soil classification, the most dominant soil types found in the study area are vertisols & Nitosolos. They account for about 47% & 31% respectively.

The vegetation distribution is summarized based up on the local agro climatic classification. The lower latitude of the district which is mostly classified as "Kolla" (tropical area) is covered with bush & stunted acacia vegetation whereas the majority part of the district is classified under "Woina Dega" is covered with some exotic vegetation like Eucalyptus trees and other indigenous trees like Tid (Hagenia abyssinica), Zigba & kosso. In the highest part of the district there is a bush like vegetation called Jibra (*Lobelia gibberroa)* (9).
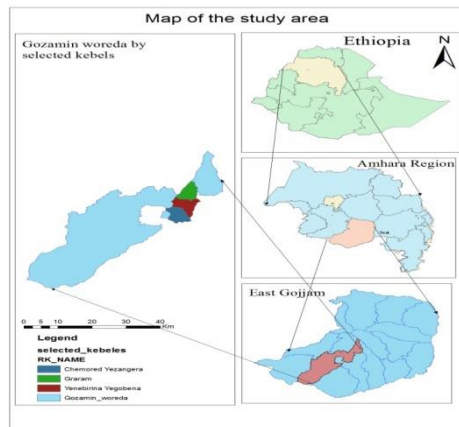
Figure 1.Map of the study site

2.2. Sampling Techniques

The sampling techniques employed in this study were purposive and simple random sampling techniques. Based on the information obtained from Gozamin district agricultural and rural development office and preliminary field survey the district has categorized in to most venerable and relatively non venerable area to land degradation (kebels).Three of the most degraded kebels- namely Girarm, Yenebrina and Chimbord were taken as part of this study. After having the list of household (HH) of the farmers' in these selected kebele, sample

size was determined proportionally to its number of kebele households. Hence, a total of 130 household farmers' were taken as a subject of this study by using simple random sampling techniques from their available lists of the respective kebeles.

The rationale behind the use of this sample size and techniques was the homogeneity of the households in their economic activities and cultural aspects which make it more representative to the rest of the population, and considering the available time as well as cost of the research work.

2.3. Methods of Data Analysis

In order to achieve the specified objectives and to answer the given research questions, the study analyzed, summarized, and presented the data both qualitatively and quantitatively. The qualitative method was employed to analyze the views of farmers and validate the quantitative data obtained through questionnaires. Specifically, the quantitative data were analyzed, summarized, and presented in the form of pie chart, frequency table and percentage by using appropriate descriptive statistics like chi square taste in order to see whether there is significance relationship between the dependent and independent variables or not by using SPSS version 20.

3. RESULTS AND DISCUSSION

3.1 Analysis of Data on farmers' awareness about the cause and consequence of land degradation

During the field survey, the respondents were asked different questions regarding to their awareness to land degradation. Among the interviewed 130 sample household head, 116 (90%) perceived that land degradation is one of environmental problems whereas the remaining 10 percent were not aware of

it. And their response is summarized as follow in the table below.

Table .1 Respondents awareness about land degradation

Responses	Yes(aware)		No(not aware)		Total	
Land degradation	Freq.	%	Freq.	%	Freq	%
	116	90	14	10	130	100

Source: Field survey (2016)

Data were also gathered from farmers about the causes of land degradation. The first and the most prioritized cause for land degradation in the study area is over cultivation which is known almost by all respondents (90%).The other major causes for land degradation were soil erosion(89%), deforestation (86%),over grazing (82%) and high number of population(72%) next to the above one. Topography (55%) and others (such as back ward traditional practice, poor way of fertilizer application, absence of fallowing) (46%) were also identified as causes of land degradation in the area respectively. Of course, these factors were interrelated and have a cause and effect relationship by themselves as stated by the respondents during the field survey.
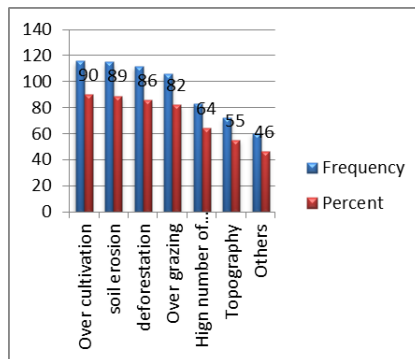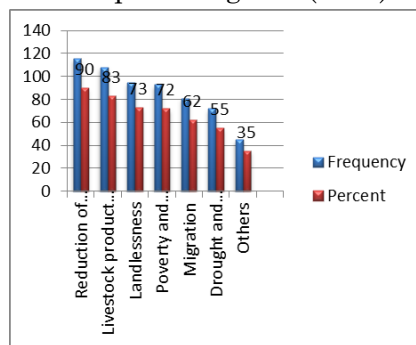

Figure 2 Respondents awareness about the cause of land degradation

The respondents were asked some questions to evaluate and understand farmers' awareness about the consequence of land degradation in the study area. Figure *5.3* shows the

respondents awareness about the consequence of land degradation. The results indicate that all aware groups of the respondents (90%) were aware of reduction of agricultural crop yield which is resulted from land degradation. The majority of the respondents were also aware of livestock product reduction (83%), landlessness (73%), poverty and dependency (72%), as well as migration (62%. Drought and desertification and others consequences (such as high demand of fertilizer, incapability of water retention) were also supported by considerable number of respondents that is 62 % and 39% respectively. According to focus group participants, farmers' knowledge about land degradation is widening through the usual contact of farmers with Agricultural development agents (DAs').

Figure 3 Respondents awareness about the consequence of land degradation

Land Degradation Awareness and its Determinant factors

Although farmers show high level of awareness about land degradation, the causes and its consequences, there is a wide gap by demographic and socio economic factors.

Hence, some of the demographic and socio economic factors were taken to further analyses to see whether there is significant association between awareness of farmers with their back ground variables or not. In this analysis, those respondents who had awareness about the problem of land

degradation (116) and non-aware groups (14) were taken for Chi-square analysis. Here those selected demographic and socio economic factors were reclassified into two group in their own section according to the responses gathered from the survey to make ease and understandable in the statistical computation (See table 5.2).

Table. 1 a chi square test result between awareness & background variable of the respondents

Background variables	Awareness about land degradation							
	Yes (aware)		No (not aware)		Total		Statistical value	
	Number	%	Number	%	Number	%	P-value	X^2
Age								
15-39(young)	74	94	5	6	79	100	0.042	4.331
>40(Old)	42	82	9	18	51	100		
Family size(in No)								
≤5(small)	54	90	6	10	60	100	0.793	0.069
>5(large)	62	88	8	12	70	100		
Educational status								
Illiterate	38	81	9	19	47	100	0.020	5.379
Literate	78	94	5	6	83	100		
Farm size(in ha)								
≤2.0(small)	74	94	5	6	79	100	0.042	4.131
≥2.1(large)	42	82	9	18	51	100		
Income (Birr per year)								
≤15,600(low)	75	94	5	6	80	100	0.036	4.421
≥15,601(high)	41	82	9	18	50	100		
Total	116		14		`130	100		

Source: field survey (2016)

3.2 Analyses of Data on farmers' attitude to land management practice

In the field survey, the target populations were asked questions regarding to their response to this problem. Among the interviewed 116 respondents who were aware of land degradation as a problem, almost all explained their different ways of responding mechanism according to their priority (See table 5.4).The data presented in table 5.4 shows the number and percentage distribution of target population intention and response for the problem of land degradation in different ways. About 90 percent, 84 percent, 67 percent, 63 percent, 62 percent, 60 percent of the respondents were used to conservation techniques of contour plowing, terracing, making

water way, crop rotation, tree planting and enclosure of grazing land respectively.

Mulching, agro forestry, mixed farming, and fallowing are also the conservation techniques which are practiced by the respondents in a less extent as compare to the above groups. They account for about 53 percent, 50 percent, 42 percent and 23 percent respectively.

Table 3 Respondents response to the problem of land degradation

Respondents reaction to the cause of land degradation	Frequency	Percent	
		Responses	Cases
Contour plowing	104	90	15.4
Terracing	98	84	14.5
Making water way on the plot	78	67	11.6
Crop rotation	73	63	10.8
Tree planting	72	62	10.7
Enclosure of grazing land	70	60	10.4
Mulching and compost	62	53	9.2
Agro forestry	51	50	7.6
Mixed cropping	42	36	6.2
Fallowing	23	20	3.4
Total	673	Each/total	Each/Grand total

Source: field survey (2016)

Determinant factors of land management practices

As it has been mentioned by many literatures the attitude and practice of land management practice is highly affected by a number of demographic and socio economic factors in a certain area. Some of these factors which are considered in this study include age from demographic group, educational status from the social factors, income level and farm land size from the economic aspect were taken and analyzed whether they have significant association with the practice of land management or not by using different techniques which have been mentioned on the above. To see this, Chi-square independence test was used by taking those respondents who perceived the existence of land degradation in the study area.

Table 4: chi square test result between response to land management & their background variables

Background variables	Respondents' response to land management practices							
	Yes(responded)		No (not responded)		Total		**Statistical value**	
	Number	%	Number	%	Number	%	P value	X^2
Age								
15-39(young)	63	95	3	5	66	100	0.01	**5.55**
>40(Old)	41	82	9	12	50	100		
Family size(in No)								
≤5(small)	38	83	8	17	46	100	0.01	**4.08**
>5(large)	66	94	4	6	70	100		
Educational status								
Illiterate	38	84	7	16	45	100	0.01	**5.74**
Literate	66	93	5	7	71	100		
Farm size(in ha)								
≤2.0(small)	75	91	7	9	82	100	0.32	**0.98**
≥2.1(large)	29	85	5	15	34	100		
Income (Birr/ year)								
≤15,600(low)	75	96	3	4	78	100	0.01	**10.84**
≥15,601(high)	29	76	9	24	38	100		
Grand Total	104	100	12	100	`116	100		

Source: Field Survey (2016)

Almost all independent variables except farm size of a farmer have shown statistically significant association with dependent variable. The independent variables which show significant association with the implementation of land management practices were all i.e. age, family size, literacy status, farm size and annual average income.

CONCLUSION

At this part, the following relevant points were drawn as a conclusion from the analysis and interpretation work of the study.

Currently, the level of land degradation and the awareness about it are varied from place to place depending up on the type and the nature of resources base and complex interaction effects of farmers' different demographic and socio-economic characteristics. The major findings of this study with respect to the awareness about the cause & consequences as well as land management practice were inferred as follow.

1. Regarding the awareness level of the community, it is found that the majority of the respondents (90%) were highly aware of land degradation which was happened in different forms (physical, chemical & biological) in the study area.

2. Understanding the causes of land degradation was also high though it showed variation among the different causes such as over cultivation (90%), soil erosion (89%), deforestation (86%), overgrazing (82%), high number of population (64%), topography (55%) and others (46%) among farmers.

3. Also respondents had high level of awareness about the major consequences of land degradation which include reduction of agricultural crop yield (90%), livestock product reduction (83%), landlessness (73%), poverty & dependency (72%), migration (62%), drought and desertification (55%) as well as on others (35%) from the highest to the lowest in the study area.

4. Awareness of land degradation among farmers who are below age 40 was relatively higher (94%) than those above and equal to age 40 (82%) though some literature pointed out that perception of land degradation and age of farmers go parallel.

5. On the other hand, awareness of farmers with regard to land degradation in related to family size, and literacy status showed that 90% and 82% for farmers who had small family size(< 5) as compared to the larger family size (>5) farmers as well as 81 % and 94% for farmers who were illiterate as compared to literate respectively. Thus small family size and literate farmers had better understanding about land degradation than large family size and illiterate farmers.

6. Similarly, awareness of farmers about the existence of land degradation is lower with farmers who had large farm size

(more than 2.1 hectare) (82%) than their counter parts (94%).This indicated that farmers with small farm size (< 2.0 hectare) were much better in awareness of land degradation than their counter parts.

7. Additionally farmers who had a less household income (<15,600 Birr per annum) developed better awareness than those who had higher household income (>15,601 per annum).

The major finding of this study with respect to response of farmers to land degradation problem in different forms include the following.

✓ Responding to the existing problem was there by the farmers using different mechanisms which include terracing(90%), counter plowing(84%), making water way on plot(67%), crop rotation(63%),mixed farming(62%),enclosure of grazing land(60%), mulching & compost utilization(53%),agro forestry (50%), tree planting(36%) and fallowing(20%).However, the reaction of the respondents is not the same in using the above land management measures because of demographic and socio-economic variables.

✓ Farmers with the age 40 and below as compared to their counter parts (farmers with the age above 40) were better in their response to this problem. This indicated that the farmers' age and response to land degradation had significant relationship.

✓ Responding on the awareness of the problem of land degradation for farmers with large house hold size (more than five) was higher than their counter parts (farmers with small house hold size, (five or less). This implied that farmers, with small house hold size were better in practicing land conservation measures.

✓ Farmers who were categorized under the literate group (93 percent) were higher than their illiterate group (84 percent) in responding to the problems of land degradation. This indicated that literacy status of farmers had strong and positive effect on response to land degradation.

✓ Similarly, for farmers with relatively small size of farm lands (more than 2.0 hectares) were better than their counterparts in responding to this problem. This implied that farmers with large farm size (2.1hectare or above) were less in response and applying different land management measures than farmers with small farm size (more than 2.0 hectares).

Awareness level about land degradation and its management practice is linked with many obscured demographic and socio-economic status of the people as well as the natural calamity. This is because there is no single self-governing factor that causes the overall depletion of this limited natural resource at local level; rather it is the cumulative effects of manmade and natural phenomena. Therefore, based on the findings of this study, the following recommendations are proposed:

1. The educational/training program which was provided for farmers should be modified by considering the existing knowledge and practices in a particular area.

2. There is a need for more development agents (DAs) to lay more emphasis on sustainable practices and also to disseminate information to farmers and address the needs pertaining to sustainable land management practices.

3. The government and NGOs should consider granting assistance to the farmers in the form of credit as these would enable them take action to use of sustainable land management practices.

4. There is a need for more advocacy work on land management practices which should be done mostly on mass

media especially on radio, through DAs, and in FCT so as to create more aware and favorable attitude of farmers towards land management practices. Awareness raising program should include family planning education as well.

5. Expansion of incentives program (such as social value, financial and material support) for those farmers who are participating in management activities of land degradation either individually or in groups.

Generally speaking, from the empirical finding of this study, multidimensional factors of demographic and socio-economic characteristics had responsible for farmers' differential in awareness and response to management practices. Moreover further research in this area should be conducted widely at micro level.

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