

Cause of Land Degradation and Its Impacts on Livelihoods of the Population in Toke Kutaye Woreda, Ethiopia

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Abstract- Land degradation in most developing countries is becoming a major constraint to future growth and development of rural livelihoods. About 40-75% of the world's agricultural land's productivity is reduced due to land degradation (Baylis et al., 2012; UNCCD, 2013). This has strong impact on the livelihood of the most population living in the rural areas; Majority of the primary data of this study was collected through household survey questionnaires, field observations and key informant interview. Descriptive statistics such as mean, frequency, percentage, and tabulations were employed to compute the land degradation and anthropogenic factors of land degradation. Multiple linear regressions was deployed for this work in order to know the relationship between the anthropogenic factors of land degradation on Crop Productivity of rural households .A key finding of this study is that the farmers pursue a diverse range of livelihood strategies in addition to agricultural activities. Experience of HHs, farm land hector size, amounts of fertilizer used and sex of HHs are each uniquely explained 8.9%, 1.6%, 1.9% and 0% of the variance in total crop production. Variables such as, education level and family size of HHs are insignificant because the p-values are greater than 0.05, whereas the four variables are significantly determining the crop production. Use land degradation risk to prioritize investments and build donor commitment plus grassroots participation to long-term engagement in the Study area:

Index Terms- Anthropogenic factors, Crop Production, Deforestation, Erosion, Land Degradation, Livelihoods

I. INTRODUCTION

Ethiopia is among the poorest country where land degradation caused damage to its inhabitant. This physical deterioration of its area had left millions of its population in suspicious how to live harmoniously with nature and smooth handling of their livelihood. The fault of land deterioration that were observed in early settlement areas of the north is seems to repeat it self in the remaining part of the country as recent phenomena. Areas abandoned or managed at low levels productivity and affecting 20-50% of the land and some 6 - 11 million people each year. Still land degradation lingers and presents the greatest threat to the survival of the nation (D.L. Johnson and L.A. Lewis, 2007.) Both extent and severity of the problem of land degradation spatial variations depending on different relief, ecology, rainfall, land use, land cover and soil types being as proximate and

underlying causes. (Ayalew ,D 2003). About 40-75% of the world's agricultural land's productivity is reduced due to land degradation (Baylis et al., 2012; UNCCD, 2013). Land degradation has negative consequences on agriculture. (Olsson et al.2005).

This study therefore seeks to identify the main impact of land degradation on livelihoods of the study area in direct and indirect ways and off-farm activities in addition to farming lands to change and improve their livelihoods.

The following are the research question of the study:

- What are the major causes of land degradation?
- What is the impact of land degradation on crop production of rural households?
- What effective adaptive mechanisms have the inhabitants developed to sustain their livilyhood?

II. RESEARCH DESIGN, METHODS AND PROCEDURES

Location

The study area, *Toke Kutaye*, is one of the 18 districts of the West Shewa Zone of Oromia Regional State in Ethiopia with the total area of 788.87 square kilometres (78887 hectares) (WOAD, 2013) and with total population of 119,999 of which 104047 (86.7 %) is rural and 15,952 (13.3 %) is urban dwellers. (CSA and IRP-CNR. (2001).CSA (2010),

Astronomically it is located between $10^{\circ}45' N$ - $10^{\circ}90' N$ and $37^{\circ}50'E$ to $40^{\circ}50'$. The area is bounded by Caliya and Nonno district in the West, Midaqegn district in the North, Ambo and Wanchi districts in the East, and Tuqur inchni district in the South. (WOAD, 2013). (See Figure 1) It has three agro-climatic zones: lowlands (desert/berha) 18%, midland (/sub- tropical /Woina Dega) 55% and highland (temperate/ Dega) 27 %. The district has bimodal rainy season: the summer, autumn, and spring based on the information obtained from CSA (2010).

Mixed agricultural practices (crop production and livestock rearing) are the major means of livelihood of the study area. Crop production is the dominant agricultural activities that most of the population of the study area engaged in and are earning their life. The livestock sub-sector plays an important role in the livelihood of the rural people in terms of providing alternative income sources, as a strategy in building resilience to shocks, stress and also in contributing to their food security. (FAO,2013)

The case study was conducted in mid highlands of Ethiopia, *Toke Kutaye* district of the West Shewa Zone in Oromia Regional State. It was undertaken on the impact of land degradation on livelihoods of peasants. The land degraded communities are found to be varied in terms of their agro-ecologies and gender (FHHs, MHHs) Musa, D. (2008)... For achieving these objectives, mixed approaches of both qualitative and quantitative research methodologies were employed

Among the 35 districts, two *kebeles*, "neighbourhoods" *Metti* and *Irrencha*, of the *Toke Kutaye* disrict were purposively selected considering the background of the population, homogeneity, similarity in, wealth, education level of the respondents. Ten per cent (10%) of the study population i.e. 100 household samples were selected out of the total 1000 households by simple random sampling methods. The proposed questionnaires were distributed; interviews and focus group discussion were employed accordingly.

For the analysis of the collected data, descriptive statistics such as mean, frequency, percentage, and tabulations were employed to compute the land degradation and anthropogenic factors of land degradation. Multiple linear regressions was deployed for this work in order to know the relationship between the anthropogenic factors of land degradation on Crop Productivity of rural households

The traditional production function was used to examine the crop productivity of farmers in the study area. The crop production model is stated thus; $Y = c + B_1 Q_1 + B_2 Q_2 + B_3 Q_3 + B_4 Q_4 + B_5 Q_5 + B_6 Q_6 + e$. Where: Y = value of crop produced by household head; and Q_1 = Household family size per household head; Q_2 = Education level of household head; Q_3 = Farm size in hector per HHs head; Q_4 = How long household head worked on farm land; Q_5 = Quintals of fertilizer used per hectares; Q_6 = Sex of household head; e = error term; c = constant.

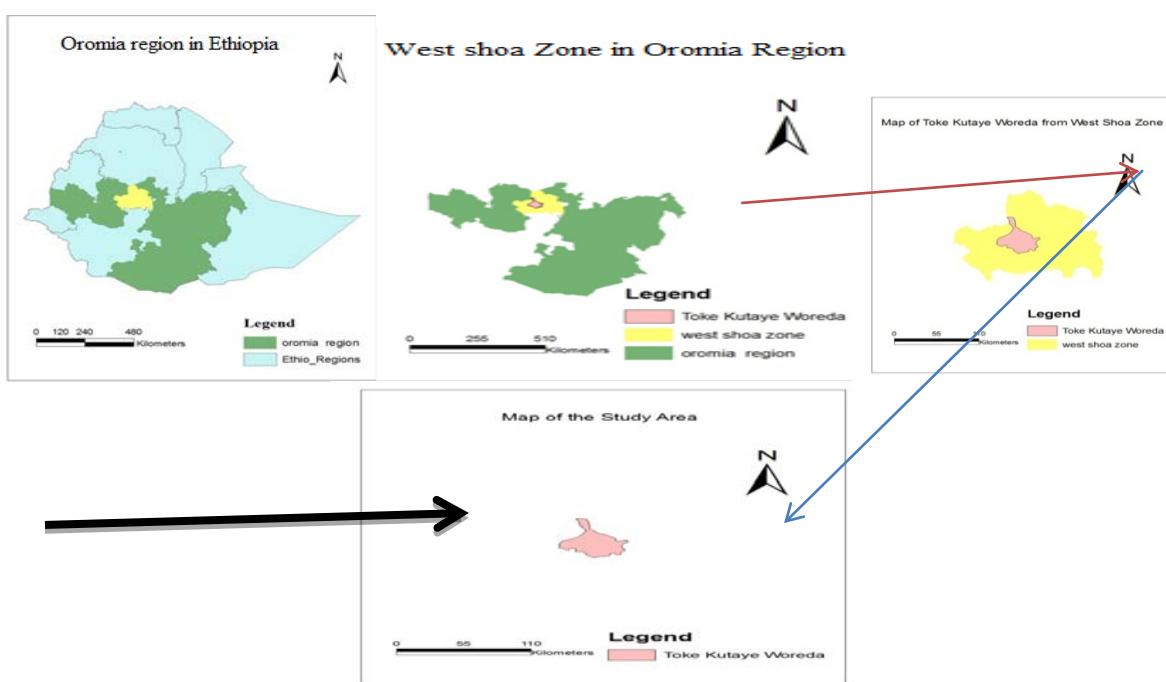


Figure 1 Map of the Study area. Source: Woreda Administrative Office, 2014

III. RESULT AND DISCUSSION

Cause of land degradation

Identification of the cause of land degradation is important for knowing the main factors contributing the loss of the resource in return influence the sustainability of the life and helps to take appropriate measurement to halt it

Table 3.1: Cause of land degradation on HHs farm land

causes	Frequency	Percent
Deforestation	18	27.7
Over grazing	5	7.7
Heavy rain	20	30.8
Wind	3	4.6
poor tillage	9	13.8
over population	10	15.4

Source: Own survey, April, 2014

Table 3.1 indicates, the main cause of land degradation are soil erosion by heavy rain (30.8%), clearances of forests for different purpose (27.7%), over population (15.4%), poor tillage (13.8%), over grazing (7.7%) and winds (4.6%) by which leads the people to inability to sustain their life, increase the food crisis and poverty. As observed from the table the fall of forest area had created favourable condition for heavy rain fall to do its activity to remove soil particles from one locality to another. The studies of WMO (2005) suggest that rainfall is the most important climatic factor in determining areas at risk of land degradation and potential desertification. Rainfall plays a vital role in the development and distribution of plant life, but the variability and extremes of rainfall can lead to soil erosion and

land degradation. These vulnerabilities become more acute when the prospect of climate change is introduced. Land degradation has resulted in the loss of the soil's productivity capacity which is a great concern to the local people (Bielders et al., 2001) who are mainly subsistence farmers

Ranking of agricultural land scarcity farmers' rural household vulnerability factor

This is identifying the main vulnerability factors that influencing the land scarce farmers and makes their life to be deteriorating. Therefore sorting their degree of impact and taking measure is mandatory.

Table 3.2: Rank of agricultural land scarcity farmers' rural household vulnerability factors

Problem	Rank	Total responses
shortage of farm land	1	98
Natural resource degradation	2	95
Soil erosion	3	93
Deforestation	4	90
Erratic rain fall	5	80
Unemployment	6	65
Death of farm animals	7	60
Hunger/food crisis	8	60
Low harvest	9	50

Source: Own survey, April, 2014

As indicated in Table 3.2 above, nine vulnerability factors are affecting the crop production in study area. As the result land was affected by multiple factors and percentages presented as follows. Shortage of farm land(98%), land degradation (95%), soil erosion (93%), deforestation (90%), Erratic rain fall (80%), unemployment(65%), death of farm animals(60%), hunger/food crisis(60%), and low harvest(50%). The farmers were unable to pay their debts for their fertilizers and other inputs due to unemployment and loss of livestock and crop harvests. Erratic rain fall was observed as one of the serious problem for food crises in the area. Reta (2010) also indicated the same results saying this vulnerability and shocks raise price and supply problems of fertilizer and herbicide, high price for renting land, rainfall fluctuations, seasonal food security problem, natural resource degradation, poor human capital, and pests and rodents (rat, monkey), which are almost affecting the area as whole.

Optional work in which respondents are engaged for sustaining livelihoods

The household of the study area engaged into different activities to sustain their livelihoods in addition to agricultural activities. The off farm activity is supporting the life of the people more than only depending on farm activities.

Table 3.3: Optional work in which respondents are engaged for sustaining livelihoods

Optional works	percent
Daily labor	3.1%
Farm animal sale	7.7%
Government employment	3.1%
Hand craft	7.7%
No optional work	56.9%
Retail of crop	1.5%
Selling alcohol	3.1%
Selling roots and fruit	16.9%

Source: Own survey, April, 2014

As indicated at Fig 3.3, the engagement of people to additional/optional work to agriculture, 56.9 % those do not have optional work rather than working on agriculture, 43.1 % are engaged themselves to other optional work like selling roots and fruits, farm animal and hand craft work, alcohol making, government employment and daily labor, and retailing of grain. The additional work is important to fill the gap of food shortage, cost of fertilizer and reduce land degradation but few of the people are working on complementary work to sustain their livelihoods.

While MHH leaving for off farm activities women and children were unable to practice land and crop protecting

activities. This resulted in yield reduction and land degradation. This also supported by Holden, *et al.* (2004) study of Northern Ethiopia that suggested access to non-agricultural activities leads to increasing soil erosion and land degradation and entailing a fall in agricultural factor productivity. This also contrasts with Davis (2008) from the rural Vietnam that revealed seasonal migration causes less use of agricultural inputs. Moreover, the outcomes of this research suggested that the participations of land scarce farmers in the non-agricultural activities have a significant spill over effects on agricultural income through raising the total agricultural factor productivity and decreasing burden on small plot of land. It has complementary to household farming in which non-agricultural income serves to overcome credit market failures. Poor farmers were not interested to engage on farm activity because of lack of drought animals, financial constraint to buy inputs, and stored food to survive. Instead they rent their plot to rich farmers or give in crop sharing agreement. In this case neither the sharecropper nor the landowners seriously take caring soil fertility through different land management practices.

Table 3.4 Deterioration of livelihoods of respondents by land degradation

	Frequency	Per cent
Yes	48	73.8
No	17	26.2
Total	65	100.0

Source: Own Survey, May, 2014

As indicated at table 3.4. The majority respondents' (73.8%) agreed that their livelihood is deteriorating from years to years. While the remained 26.2% of the respondents answered differently. They said no land deterioration in their plot since they were supported by their level of education and financial status that they have. Most farmers were complained that climate variability's were more responsible for moving to unsustainable life situation. Delay of rain fall affected land preparation and crop production in amount. Too much rain fall was responsible to remove fine and fertile soil which is responsible for creation of hunger and deterioration of the life condition of the population in the area.

As the result of land degradation whether due to climate change, erosion or drought there is costs to be paid to manage the problems incurred. For instance the cost of fertilizer to boost yield, conservation and plantation are some of the results of land degradation

Table 3.5 Types of crops as factors of degradation

Types of crop	%
Barely	40%
wheat	33%
Bean	12%
pea	2%
Maize	2%
Teff	2%
Other	3%

Source: Own survey, April, 2014

As illustrated in the table 3.5, barley (40%) is the most important crop in the area followed by wheat (33%), bean (12%), pea (8%), maize and teff (2%) and other production contain (3%). Most crops have high ecological adaptability with high ability to fix nitrogen to the soil but their ability to fix nitrogen is not matching with what the population is doing in the area. Naturally these crops need more space to grow which can allow the removal of soils particles during early growth of plants and after harvest if heavy rain fall occurs in the area. These crops canopy and crop residue only protect the soil for a relatively short period of time. Neither soil fertility nor better livelihoods can be achieved. This has a negative impact on eroding soils and enhancing land degradation in the area.

Table 3.6: Average of livestock of the respondents

Livestock	Total	TLU conversion	TLU	%
oxen	117	0.7	81.9	24%
cows	84	0.7	58.8	11%
Heifers	23	0.6	13.8	22%
calves	51	0.6	30.6	2%
sheep	186	0.1	18.6	15%
Goat	49	0.1	4.9	7%
horse	82	0.8	65.6	11%
Donkey and mule	18	0.7	12.6	2%
TOTAL	783	4.31	288.53	100%

Source: Own survey, April, 2014

There are several reasons that a household keeps livestock. The primary purposes of herding livestock include provision of draught power, production of dung to use for bio-fuel and production of compost/manure to fertilize farmlands, a form of capital accumulation serving as security against emergencies, to fulfil social obligations such as gift, and provision of dairy and meat products, which have a role in the household income. Therefore, livestock rearing complements crop production and crucial asset diversification mechanisms. Livestock fattening is one of the productivity enhancement mechanism of livestock in the Kebele. Commonly, oxen from farm and sheep are fattened as high income generating activities for some households. They use Nug cake (fagulo), crop residues (like straw), and hay (Tsegaye, 2012).

Table 3.6 shows the largest livestock percent is chicken 24% and the next followers are sheep 22%, oxen 15%, cows 11%, horse 11%, and etc. As observed from the value or coverage of the livestock the coverage of the cattle's are small due to the farmers lack the farm land, pasture land and the existing area is fragmented by land degradation. There is direct relationship between land availability and the number and types of livestock's. Farmers were forced to limit themselves in holding animals with low value of TLU value not to damage their environment and to full fill their daily financial demand by selling them. The existing number of live stocks in relationship of the land area is able to create land degradation in the study area according many researchers results in this country.

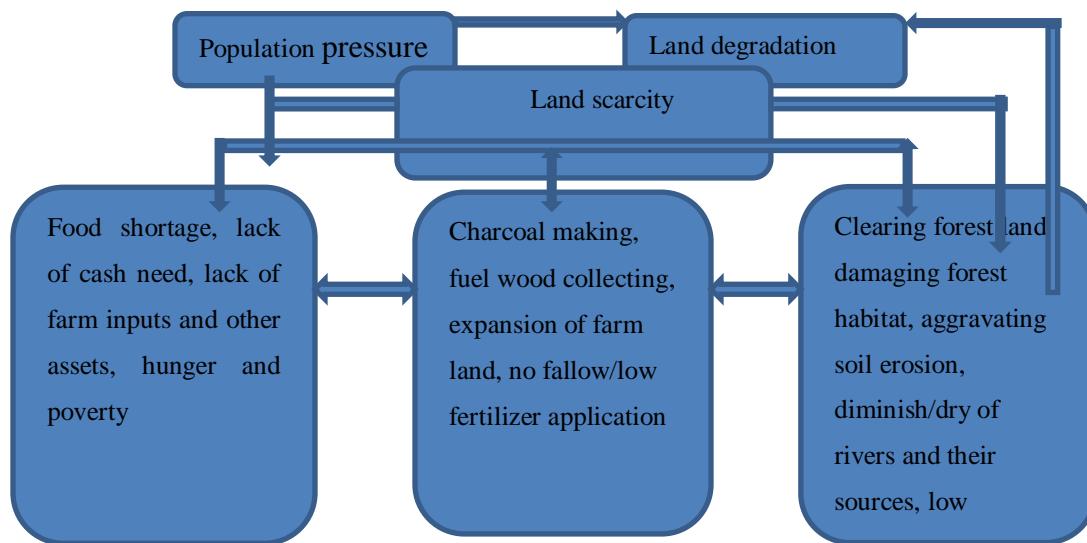
According to the key informant interviews, both the livestock population and grazing land have highly decreased in the past couple of decades and all respondents also believe the same. This is due to population increment and expansion of farmland among others. Grazing lands are converted to cropland as there is always the need to expand farm plots among land scarce farmers who are outweigh ting with increase in population.

The land condition of the household respondents in the study area, 58.5 % is fragmented due to farming the unfavourable land and poor managements (bad practice of tillage, poor management, and land level) and 41.5% is not fragmented relatively those who pay more attention for their lands due to their better educational status, care for their lands, and levelled

land. Condition of land status indicated that trends of land degradation which is resulted from bad practice of tillage, poor management, and land level. Therefore, the land hold system of the Toke Kutaye is relatively more degraded why that most of them difficulty to bear their family.

Figure 2 showed that the personal observation final conclusion among different factors which jointly form land degradation .These are , over population which cause farm land scarcity resulted in food shortage, and hunger, and pressure on forest areas and inducing soil erosion which finally manifested in land degradation. Land degradation derived a number of critical environmental, economic, and social issues in the area and caused stress and shock in life-support of society.

Fig 2: Cause and effect of agricultural land degradation



Source: Own conceptualization based on FGDs, April, 2014

Livelihoods are fundamentally grounded in the agricultural sector and it can be argued that poverty has its roots in the notion of access to resources and vulnerability of livelihoods to shocks. Therefore, the production and reproduction of rural poverty in the country cannot be de-linked from land and from other agricultural resources.

Over population is pushing the farmers to cultivate steep slope and neglected lands in the area for centuries. The physical characteristics of the area supported by traditional ways of land utilization had accelerated land degradation .The intensity of degradation varies from place to place in the study areas. The same result was obtained by FGD. According FGD the main problem of land degradation in the study area is scarcity of land, farming the sloppy area and less practicing of the soil and water conservation. This improper utilization of resources led to hunger, death and created ecological refugees among the young population, pasture reduction and death of their livestock's. Whether the above statement is true or not questions were given to farmers and the following results were obtained (See Table 3.3).

Anthropogenic factors affecting crop production

This model of multiple linear regression of crop productivity is used to analysis the impact of independent variables like sex of rural households, family size of rural households, education level of rural households, quintals (sacks) of fertilizer used per hectors of total lands of household, how long households worked on farm land/experience, farm land hector of rural household on the dependent variable average (crop production). Before analysing the model it was important to check the normal distribution of the dependent variable. The normality is tested by the P_P plot as depicted on figure 1 in appendix 1. The error is normally distributed; the dependent variable the average of crop production is normally

The assumptions of homoscedasticity are that error variance should be constant and the variance of the residuals is homogeneous across the levels of the predicted values. There should be no observable structure for the distribution of residuals. Due to VIF/ variable inflation factor from the table 4.10 is less than 10, so there is no problem of multi Collinearity. Table3.8 in appendix 1 show the DV and IV have weak

correlation. Again the other assumption should be raised in the analysis of the crop productivity model is the Autocorolality test/ the random disturbance or self-correlation of the q_i over times for crop productivity over the time and year which is tolerable when the Durbin-Watson test value between -3.5 to 3.5 which means the average of crop productivity does not have Autocorolality problem. The other important things in table 4.9 is the R square,

75.6% the 4 independent variables (sex of household head, farm land hector, quintals of fertilizer used, and how long household worked on farm land) are significant linear relation changes in the dependent variable average crop production and the other changes are subject to extraneous variables. The variable with larger coefficient earns 75.6% units larger on average.distributed or errors are identically and independently distributed.

Table: 3.7. Model summary of regression adjusted R square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics							Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	F		
1	.870a	.756	.686	2.3129	.756	10.723	6	58	.000	1.212		

Source: author survey, 2014

Table:3.8 Analysed model of the average crop productivity

Model	Unstandardized Cof			Stand ardiz ed Cof	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. E	Beta				Lower Bound	Upper Bound	0-order	Partial	Part	Tolerance	VIF
(Constant)	1.965E0	1.222E0		1.609E0	.020	-.480	4.411						
How long households worked on farm land	.087	.026	.413	3.311E0	.002	.034	.140	.611	.399	.299	.526	1.903E0	
Farm land hector of rural households	.371	.269	.231	1.377E0	.030	-.168	.910	.625	.178	.125	.290	3.447E0	
Quintals (100SKg) fertilizer used per hectors of total lands of hhs	.515	.335	.230	1.536E0	.048	-.156	1.186	.617	.198	.139	.365	2.742E0	
Education level of rural households	-.172	.156	-.118	-1.104E0	.274	-.485	.140	.096	-.143	.100	.718	1.393E0	
Sex of rural households	-.701	.906	-.076	-7.736E-1	.042	-2.515	1.113	-.113	-.101	-.070	.840	1.190E0	
Family size of rural households	-.044	.114	-.040	-3.849E-1	.702	-.272	.184	.256	-.050	-.035	.753	1.328E0	

Source: Author survey, 2014

a. Dependent Variable: Average quintals of food grain produced per hector of hhs farm land

Hence, the reduced model of the regression analysis is found to be:

$$Y = 1.222 + 0.41x_1 + 0.231x_2 + 0.23x_3 - 0.076x_5 + \epsilon_i$$

The reduced regression model indicates that the household long experience is more food production than that of short experience, the high experience of farmer change their production productivity to the unit of 41%. The average of crop production increases with the change of unit of size of farm land

per hector in 23.1%. The more quintals of fertilizer used the high yield production but incurs the more costs, the more use of the unit of fertilizer of Quintals (100^sKg) the more production yield by 23% and the sex of HHs per head is also have negatively impact on crop production, The male household head produce

more production relative to the female household head by 7.6% changes in the unit of crop production.

The two variable, education level and family size of HHs are insignificant because the p-values are greater than 0.05, whereas the four variables are significantly determining the crop production.

The other important things in table 4.10 are part which indicated the variance distribution of the significant predictors in determining the total variance in crop production. Experience of HHs, farm land hector size, Quintals of fertilizer used and sex of HHs are each uniquely explained 8.9%, 1.6%, 1.9% and 0% of the variance in total crop production

The finding of Muia and Ndunda (2013) also support this finding by saying that there are a lot of factor that affect the crop production among them the major are fertilizer, climate condition, way of managements and farm size and type, pests and soon.

IV. CONCLUSION AND RECOMMENDATIONS

The case study was conducted in mid highlands of Ethiopia, Toke Kutaye Woreda of the West Shewa Zone in Oromia Regional State. It was undertaken on the impact of land degradation on livelihoods of peasants. The land degraded communities are found to be varied in terms of their agro-ecologies and gender (FHHs, MHHs). The investigation was undertaken with the main objectives of identifying the major cause of land degradation, assessing the impact of land degradation on livelihoods, and identifying adaptation measure of soil and water conservation of land degradation in the Woreda. For achieving these objectives, mixed approaches of both qualitative and quantitative research methodologies were employed.

A key finding of this study is that the farmers pursue a diverse range of livelihood strategies in addition to agricultural activities. Importantly, the study of the impact of land degradation on livelihoods could benefit farmers focusing more on soil and water conservation measure to reduce the impact of land degradation on their livelihood directly or indirectly influence agricultural activity and NRM through their impact on economic and social well-being. Acknowledging farmers 'participation in a range of livelihood strategies can assist in developing a more complete picture of livelihood portfolios of land degradation cause and impacts, and their social and economic circumstances

Conclusion of this study can be summarized as follow:

The major cause of land degradation that influence the livelihoods of the rural people economy like soil erosion by heavy rain which facilitated by farming sloppy area, clearing forest land for cultivation due to raising of human population in the area, low level of education resisting to accept the new packages of soil and water conservation measure and sustainable management of natural resources.

There are a number of shocks and stresses that trigger livelihood diversifications among the farmers in both communities though farmland shortage is the top most important of all as access to it could have positive effect on others. Factors like soil degradation, population pressure, deforestation, low

level of rural economy diversifications have complicated and, directly or indirectly, contributed to land scarcity as result land degradation.

Finally, practicing the major soil and water conservation both physical and biological conservation rather than practicing only alone few of construction of canals, terrace, inter cropping and other in combination to manage the soil fertility, increase crop production and managing natural resources to maintain safe environment, reduce climate change and in general reduce/halt land degradation increase the economic growth of the country as whole.

The main Factors that affecting the crop production of the study area are land degradation which including soil erosion, deforestation, reduction of productivity, reduction of pasture land which affect the crop production of the particular area and the economy of the country as whole. Other related factors like farm land size, education level, sex of household heads, experience of farmers, family size and quintals of fertilizer are also used the most issues underlined to contribute for crop production. The strategies practiced prior by government to tackle the problem is the soil and water conservation measure to some extent but not fully practiced due to the fact that people have not full knowledge about it, the extension agents do not continually follow them due to the area lacks roads, even though the people not engaged to another activity outside of agriculture they sale wood and charcoal for surviving themselves and their family (WoRD, 2014).

If the problem is not solved in short period of time the people of the area rests into lack of enough food/food insecurity, climate change, total loss of soil fertility, hunger, gully formation, fragile land, desertification, poverty. The crop production of the target group is affected and in general the socio-economic, politics of the county is distorted. Land degradation by-product of environmental changes, has been factor that results in increasing the likelihood of migration, decreasing soil productivity, increasing price of farming inputs, and decreasing arable land area, all of which decrease a household's ability to provide sufficient livelihood for their family, thus, increasing the risk of outmigration, reduction of agricultural productivity, lack of enough food, reduction of economy, expansion of poverty, starvation etc. (Hunnes, 2012).

Recommendations

Based on the above findings and lessons drawn from the impact of land degradation on livelihood strategies of the peasants and the need to alleviate adverse effects on the natural resources of the Woreda, the key remarks are made. As the major limiting factor of the sustainable utilization of local natural resources is land scarcity, which is depleting natural resource base, the following amending actions should be taken.

The roles of non-agricultural activities (NAA) are critical to address some of the key problems of agricultural land scarce peasants and minimize natural resource degradation. Thus, policy makers and NGOs should give due attention to promote and support NAA.

Promote regional environmental cooperation in addressing climate change, migration and Deforestation-LD: Issues of climate change and migration are regional in nature, and as such

should not only be managed at the national level, as is most commonly the case today.

Use land degradation risk to prioritize investments and build donor commitment to long-term engagement in the Study area: Addressing climate change impacts on livelihoods requires long-term financial commitment and improved coordination of investments. Identified land degradation risk from climate change impacts on livelihoods and food security can help prioritize programming and funding in the region. Existing climate change adaptation funding sources – such as Green Climate Fund, the Adaptation Fund and the Clean Development Mechanism (CDM) should be used to address the emerging issues (UNEP et al., 2011).

Therefore, the study has contributed to the collective understanding of how human, bound together in economic units called households, alternatively adopt different livelihood strategies, and respond to resource constraints, specifically agricultural land scarcity, and influencing the natural resource base - land degradation in the case study area. Improving the educational level of household members can allow the family unit to make the right choices about their livelihoods, including access to new technologies to use the existing land more efficiently; adoption of new varieties to enhance crop productivity; and family planning to reduce the pressure on limited resources. Creating opportunities for rural off-farm and non-farm employments absorb a big share of landless, thereby fostering diversifications of income sources for the households.

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