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Socioeconomic Driving Forces of Land use/Cover Dynamics and its Implications in Wallecha Watershed, Southern Ethiopia

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Abstract- The objective of this study was to examine land use/cover dynamics and its implications in Wallecha Watershed, Southern Ethiopia. The study referred to have applied perceptions' analyses, descriptive statistics, semi-structured and face to face interviews to identify the causes of the changes. The study showed, high population pressure, which in turn leads to increasing demand for land and trees and change in farming systems, poor institutional and socio-economic settings, lack of land tenure security and inappropriate land use practices were identified as the reasons for the changes. Thus, it was understood that LU/LC is inevitable; that it was occurred at all times in the past, are presently ongoing, and are likely to continue in the future. The changes in LU/LC in the study watershed have both positive (degrading) and negative (enhancing) impacts on particular environmental and ecological changes of the watershed.

Keywords: land use/cover, dynamics, expansion, driving forces, wallecha watershed.

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I. Introduction

Land is one of the major factors of production along with labor and capital and an essential input for housing and food production. Thus, land use is the backbone of agricultural economies and provides substantial economic and social benefits. Land use change is necessary and essential for economic development and
social progress.

Driving forces are defined by Holman *et al.* (2008) as causes of environmental change which are exogenous to the region. This may be anthropogenic induced climate change, national and international policies or socioeconomic changes. Driving forces are the forces which cause observed landscape change. Briefly, driving forces are the factors which cause changes in a system. They may be social, economical or ecological and may have positive or negative influences.

A number of LULC dynamics' studies have been carried in the south west part of Ethiopia at catchment, zone, watershed and village levels. In Gibe valley, the land use changes were perceived to be caused by the combined effects of drought and migration, changes in settlement and land tenure policy, and changes in the severity of the livestock disease, try panosomosis (Robin *et al.,* 2000). High population pressure, which in turn leads to increasing demand for land and trees, poor institutional and socioeconomic settings, lack of land tenure security and poor infrastructure development were identified as the reasons for the changes in Silte zone (Daniel, 2008). These village case studies in parts of the south west Ethiopia identified large scale plantations expansion, communities' crop field expansion, lack of clear land use plan, change in farming system due to population growth as the causes of the changes. In Awassa watershed, which is located in the south central rift valley of Ethiopia, forest land use change was studied from the perspective of socio-political and geographical factors. The causes for the decline were attributed to geographic properties, socio-political changes, population growth, unstable land tenure principles, agricultural development, and the improvement of transport capacity (Dessie and Christiansson, 2008). The studies referred to have applied perceptions' analyses, descriptive statistics, semi-structured and face to face interviews to identify the causes of the changes.

As a result, this study is used to analyze the effect of different hypothesized socio-economic drivers on shares of agricultural land, forest land, and grassland and shrub land uses in the Southern Nations and Nationalities Region of Ethiopia. In this paper the researcher intended to a) discuss the state of the socioeconomic driving forces, b) present the implications socioeconomic drivers on sustainable land management of and, c) propose a standard procedure to study driving forces of landscape change.

II. Description of the Study Area

a) Location

The Wallecha catchment is found in the Southern highlands of Ethiopia, within the Wolaita Zone, Southern Ethiopia and forms the middle course of Bilate drainage system. Astronomically, the watershed is located between 6º53'30" and 7º4'30" N Latitude and 37º48'0" and 37º59'0"E (Fig. 1). It is found within the edge of southern Main Ethiopian Rift System, North-west of Lake Abaya in Southern Nations Nationalities People's Regional State. More specifically, the watershed lays in Damot Gale Woreda, located at 350km south of Addis Ababa and 153km southwest of Hawassa, capital of SNNPR.

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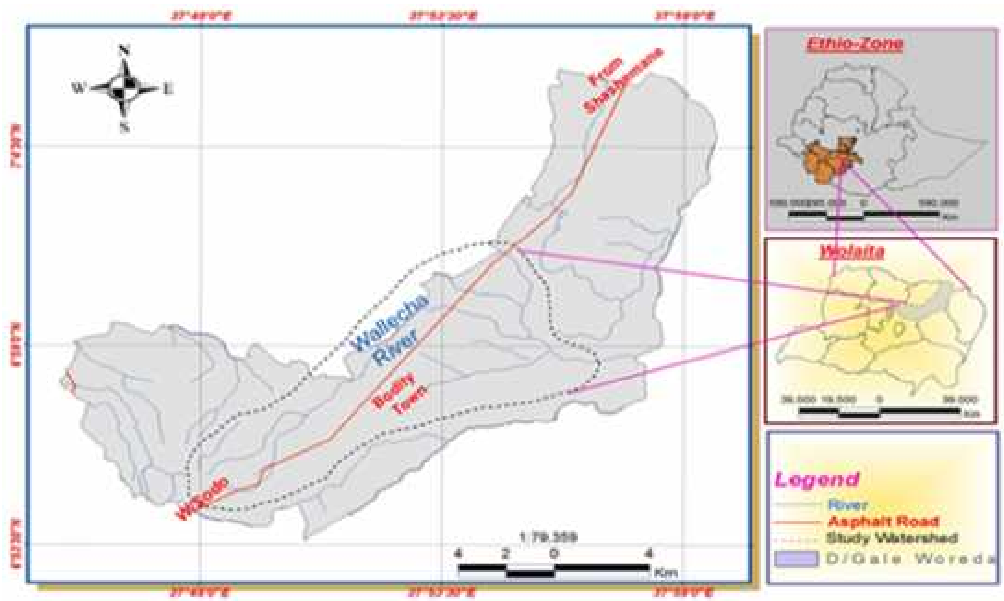

Fig. 1: Location Map of Wallecha Watershed (Source: Extracted from Ethio-GIS)

b) Climate

According to MOA (1998) Agro-Climatic Zone classification, Damot Gale *Woreda* in general and the study watershed in particular experience moist Dega (humid temperate) and wet Weyna dega (humid subtropical) agro-climatic zones. According to the traditional agro-climatic zonation, which is based on overlaying rainfall, temperature and altitude, the area that lies above 2300 m and accounts for about 10.8 percent of the total area falls within wet *dega* agroclimatic zone, while the remaining 89.2 percent that has elevation between 1751 and 2300 m lies within the wet *weina dega* agro-climatic zone (Fig.2). However, these diversified landforms are highly interactive and related to each other via drainage systems and socio-cultural condition.

The annual average rainfall is around 1185 mm, and the mean annual temperatures fluctuate between 16 and 21°C all along the year (Fig. 3, and 4). The main rainy season is from April to September and presents a bimodal scheme every year. The mean annual temperature of the study area varies from 21°C in the rift valley floor to 16°C on the escarpment mainly due to variations in altitude. This climate enables a Length of Growing Period of almost 300 days. That's why Wolaita farmers carry out two cycles of seasonal cropping (the *gaba* during the short rainy season from February to July and the *sila* during the long rainy season from August to December) and sometimes an inter season cycle from December to March. The principal feature of rainfall in most parts of the study watershed is its seasonal character, poor distribution and variability from year to year (Fig. 3 and 4

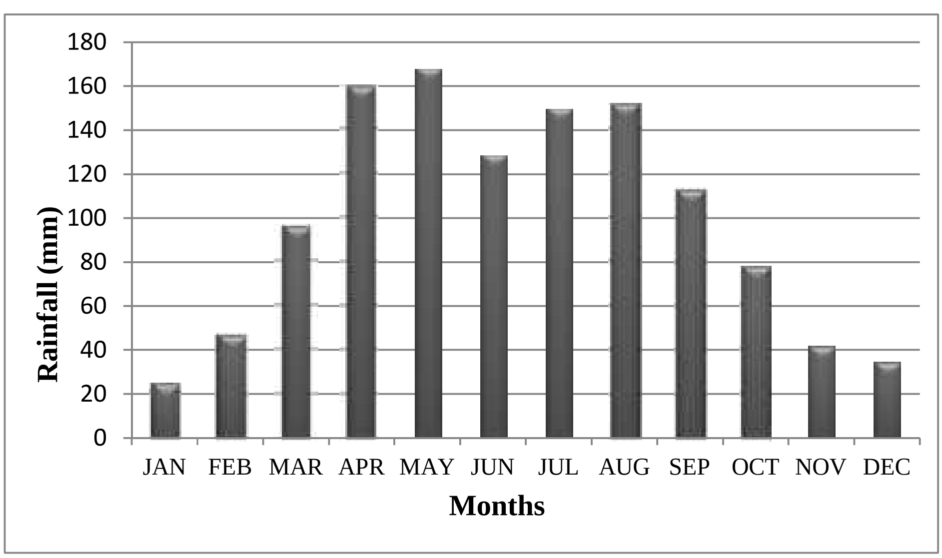

Fig. 2: Mean monthly rainfall pattern for the study area recorded at Bodity station from 1976-2012.

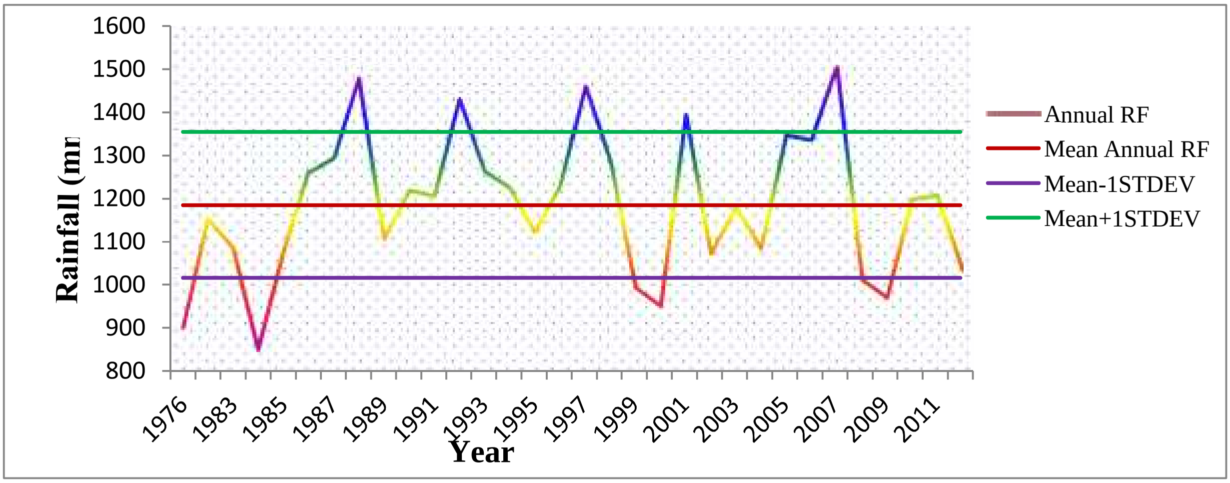

Fig.3: Annual rainfall variability for the study area recorded at Bodity station (1976-2012)

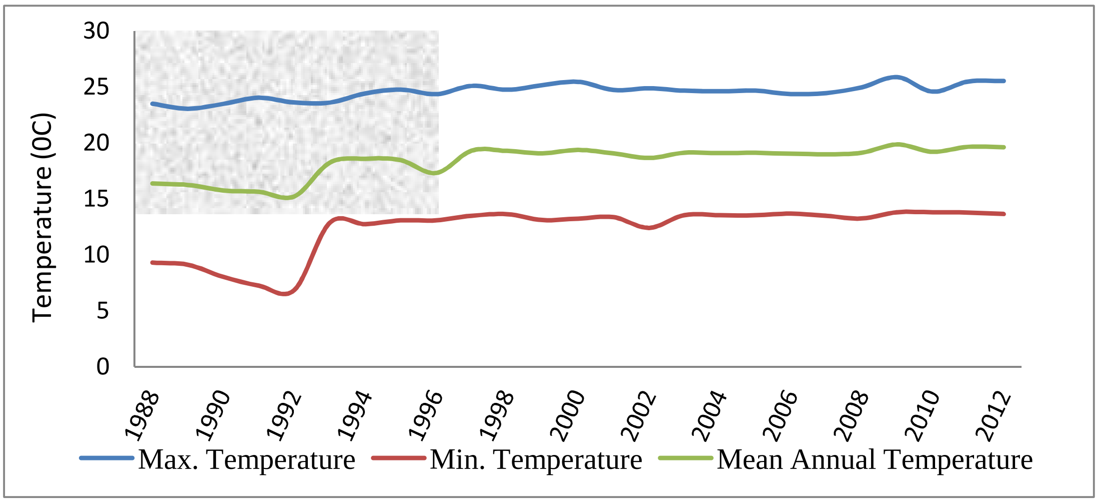

Fig.4: Mean annual temperature distribution recorded at Bodity station (1988-2012)

c) *Socio-economic Aspects of the Watershed*

i. *Population and Settlement Pattern*

Demographic factors play an important role in the evaluation of the current as well as the potential land use, which is the product of interaction of man with land. High population pressure is a reflection of the incidence of poverty and at the same time a key factor in accelerating deterioration of the natural resources base, particularly forest (EFAP, 1994). According to the 2007 Ethiopian Population and Housing Census, the Woreda is the most populated in Wolaita zone with a total population of 154, 610 and of which 51 percent were women (CSA, 2008). As to WBoFED (2013) report, currently the study watershed has a total population of 68238, of which nearly 86 percent lives in moist *weina dega* (Table1).

The Woreda has estimated population density of settlement exceeding 781 persons per km2 which is greater than the zonal average 349 people per km2, and is one of the highest densities in Ethiopia. The growth rate would be higher than 3 percent, with an estimate of the doubling of the population from here to 24 years, which suggests that the site is "a full world which is going on filling"(Le Gal and Molinier, 2006). The area is characterized by high population density that reduced average individual land holding to less than 0.5 ha. According to CSA (2007) the working and life unity of this population is nuclear; on average, families are made up of 6 to 7 persons. Moreover, the rural population of this region is very young; 60 percent of the population is less than 20 years old.

Table 1:.Population distribution in the watershed, 2012 (Source: WBo FED, 2013)

S.N	AEZ	Nº of KFAs	Area (ha)	Area (%)	HH	Population size	Population (%)
1	Moist *Dega*	2	1904.5	18.8	1486	9711	14.24
2	Moist *Weina Dega*	8	8211.5	81.2	5497	58527	85.76
	Total	10	10116	100	6983	68238	100

Moreover, according to the regional statistics, the ratio of working farm population to non-working farm population is very weak (0.9 agricultural labourer for one non-working people). It indicates that the great part of the income earned by an agricultural worker will be devoted to meet not only its needs but also those for non-working people (less than 15 years old children, and old people) who depend on him. It will be very difficult to save or to reinvest what has been produced. This in turn created new demands for additional space, food and other resources.

ii. *Farming System and Crop production*

The farming system in the study watershed is of subsistence type. The demographic pressure and shortage of farmland has forced farmers to adopt continuous cropping systems abandoning completely even seasonal fallowing. Farmers of the study area pointed out that continuous cultivation of land are the only coping strategy they adopt to provide food for their families. It has been confirmed that the area is recurrently hit by food insecurity mainly because of population pressure, environmental degradation, erratic nature of rainfall; land shortage and lack of modern agricultural implements and input.

iii. *Land use Pattern*

The land use in the study watershed is based on mixed rain-fed agriculture. More specifically, it is *enset*-coffee live stock system that combines annual and perennial crops with livestock production (Le Gal and Molinier, 2006). The typical household land use exhibits a spatial pattern in which homes are ringed with *enset*, coffee, fruit trees and spices. Farmers plant these crops closer to their houses for ease of fertilization with manure and household refuse. Distant fields are occupied by grains, root crops, grazing fields and woodlots.

III. Methods

a) *Data Sources and Methods of Collection*

Identifying the pattern of LU/LC and its implication on the landscape was analyzed by using biophysical and socioeconomic survey data. For this research, the necessary data were collected from both primary and secondary sources. They were derived through using questionnaires for structured interviews, semi-structured interviews for indepth face-to-face interviews with key informants, guiding questions for FGD, and checklists for field observation.

Data collection was done through a methodological triangulation; this entailed the use of multiple methods to study a phenomenon or a problem.

b) *Sampling Techniques*

The three selected *Kebele* Farmers Association (KFAs) where socio-economic survey was conducted in the study watershed include: areas belong to high altitudes (Woshi Gale), middle altitudes (Fate) and lower altitudes (Ade Damot). A total of 145 households (HHs) were selected. The selected sample size was regarded sufficient because more than 5 percent of the study population was included.

The sample (n=51) was 7.43 percent of the 686 HHs in Woshi-Gale; (n=42) was 7.39 percent of 568 HHs in Fate whereas it formed 7.54 percent of 689 HHs in Ade Damot KFAs were taken proportionally. Given the relative homogeneity of the subsistence farms in the two agro climatic zones in terms of physical environmental factors and resource endowments, the sample size of each agro climatic zone would be reasonably representative of the population it stood for. Moreover, knowledgeable key informants were included into the study through purposive sampling technique.

c) *Data Analysis*

The analytical approach initiated with a background study on literatures (Fig.5). Then a meeting was held with Wallecha watershed committees and KFA representatives. The meeting was aimed to define the key drivers of the LU/LC change that are susceptible to be affected by any of the elements generated by human activity, exploring the main driving forces affecting the environment, societal response (policy measures) to such unwanted impacts and to consider local people viewpoints about the watershed.

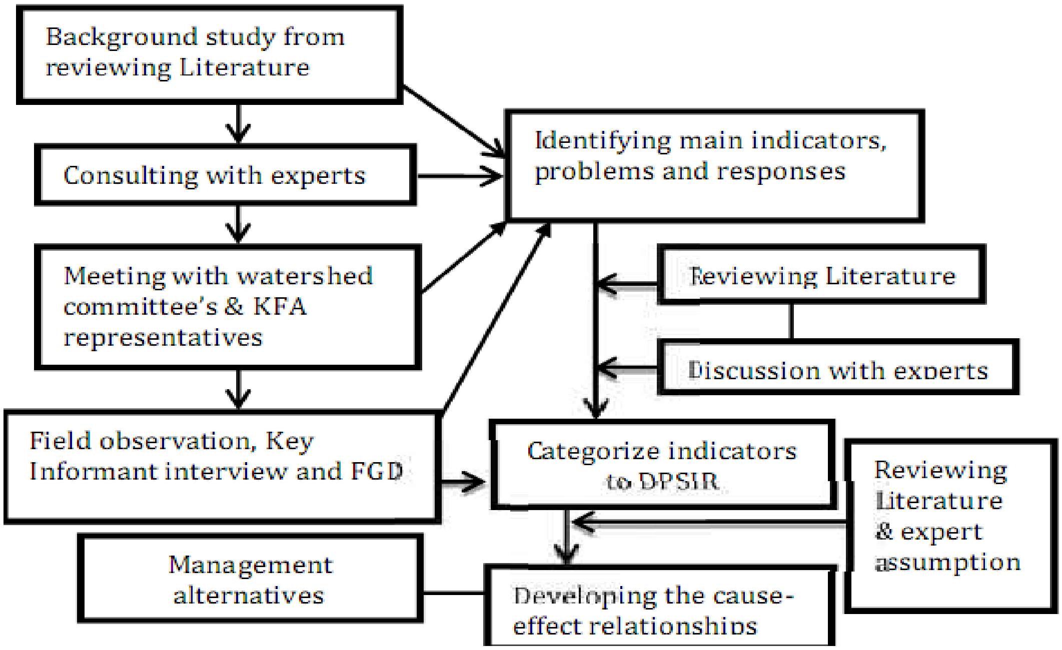

Fig. 5: Analytical flow chart for socioeconomic drivers of LULC

IV. Results and Discusion

a) Socioeconomic characteristics of the respondents as a factor for LU/LC Changes

i. *Demographic Characteristics*

Socio-economic characteristics are believed to be the major determinant factors in land management practices, of which land use/land cover change is one. Studies of household lifecycles (demographic composition) in the tropical Africa have been linked to satellite data revealing the role of gender and age structure of households in deforestation trajectories (Mc-Ginley, 2008).

As indicated in Table 2, 145 sample households from the three KFAs were studied, of which 38 (27%) were female headed. They better represent as compared to the percentage of female-headed households in SNNPR (23.3%) as well as the country as a whole (24.7%) (CSA, 2008). As indicated in the table 2, household heads in their (25-64) age group make up 85.5 percent of the total sample households. These age groups of household heads are better experienced in land management practices as compared to the other two age groups. As revealed in FGD, young household's heads rapidly deforest their property in their first five years of forest occupation as they seek to establish their farms and provide subsistence for the household. They steadily reduce the annual rates of deforestation with length of occupation, shifting land uses to more permanent crops (enset, sugarcane) and pasture.

Table 2: Demographic composition of the sample households

Variables		Woshi-Gale (Upper)	Fate (Middle)	Ade Damot (Lower)	Total	%
Sex	Male	40	29	38	106	73
	Female	11	13	14	38	27
	Total	51	42	52	145	100
Age	<25	5	2	8	15	10.3
	25-64	42	40	42	124	85.5
	60-above	4	0	2	6	4.2
	Total	51	42	52	145	100
Marital status	Married	45	38	46	129	89
	Divorce/ed	4	2	3	9	6.2
	Widow	2	2	3	7	4.8
	Total	51	42	52	145	100
House-hold size	< 15	186	147	173	506	50
	16-64	174	143	181	498	49.4
	>65	4	0	2	6	0.6
	Total	364	290	356	1010	100

Source: Field survey, 2013

Nearly 90 percent of the household heads are married while the remaining few are widowed, and divorced. The total population of the sample KFAs has been 1010, of which 506 (50%) were aged less than 15 and 498 (49.4%) adults; with a dependency ratio of 102.8 percent. The average family size in the area was 6.97, which is higher than national average (5.4) and majority of households (85%) have 6-10 members in the family, though there exist disparity throughout the studied KFAs. In traditional society under which the farm economy and consumption tends to be mainly Family-centered; the per capita food availability declines when the number of consumer increases. This is, in fact, one of the reasons for blaming rapid population growth and the resultant large family size.

Therefore, under condition of degraded soil, diminished holdings and obsolete production techniques coupled with large family size, especially dependent family members can do nothing for increasing agricultural production.

However, according to the perception of village elders, large family size is considered to be an asset for the households; since children at the early ages engaged in looking after cattle, fetching water and fuel wood.

ii. *Household asset ownership and technology use at Wallecha watershed*

As indicated in Table 3, assets such as educational attainment of household head, size of land and labor, size of livestock and input uses are the critical factors that affect wise use of resource, farm economic performance and influences food production. It is hypothesized that education would have a great influence for the awareness of farmers regarding the land use land cover change issues. In the study watershed, educational attainment of the household heads was varies at KFA level, though it was nearly 50 percent for literate and illiterate at an aggregate level.

Hence, it is assumed that households' food security and size of landholding have a strong positive relation. In the study area, the mean holding size per households was 0.43 ha, which is much less than the national average. Thus, the holding sizes were very small, which indicates high population pressure on existing land resources. Majority of respondents from three parts of the watershed, 49 percent in upper altitude, 48.7 percent in mid altitude and 44.2 in the lower altitude had farm sizes in the range of 0.25 to 0.5 ha. A relatively small proportion (30%) of the total respondents indicated that their farm size was more than 0.5 ha (Fig.6 and Table 3) even though, slight differences in landholdings was observed at the different parts of the watershed.

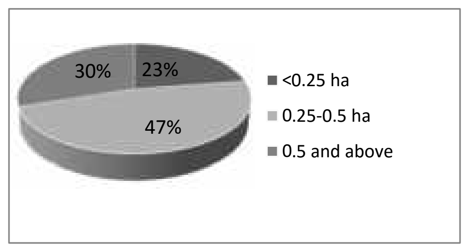

Fig. 6: Landholding's of sampled households (Source: Field survey, 2013)

Table 3: Household asset ownership and technology use in sampled KFAs

Variables	Woshi-Gale (upper)	Fate (middle)	Ade Damot (Lower)	Total (%)
Educational level of HH (%)				
Can't read and write	55	38	44	46
Read and write	45	62	56	54
Land holding (%)				
<0.25	23.5	26.8	17.3	22.5
0.25-0.5	49	48.7	44.2	47.3
0.5 and above	27.5	24.5	38.5	30.2
Number of plots (%)				
1	29.4	41.5	32.7	34.5
2-3	57	51.2	42.3	50.2
4 and above	13.6	7.3	25	15.3
Livestock holding (%)				
<3	37	49	50	45.3
3-5	48	40	45	44.3
5 and above	15	11	5	10.4
Use of agricultural input				
Chemical fertilizer	40	54	50	48
Improved seed varieties	24	36	35	31.6
Compost and manure	36	10	15	20.4

Source: Field survey, 2013

The average numbers of fragmented plots a farmer owned and managed were 2.17. Land fragmentation is a constraint to land management and the intensity of cultivation. This was clearly observed in the study area, where peasants planted *enset* around their homesteads and invested more in their *enset* fields. A great majority (90%) of respondents stated that their holdings had decreased over the previous 26 years, for several reasons: 35 percent of the respondents reported that the 1975 land reform and its consequent land redistribution was one of the main factors, while 20 percent attributed the decrease to soil erosion and gully expansion, and 45 percent to increased population pressure.

At present, the main way to gain access to land in the study area is by inheritance and share cropping. Moreover, as indicated by key informant (Molliso Ade, the chairman of Fate KFA) there was also a redistribution of communal grassland performed in 2007 to farmers in order to provide land to those who were landless. However, land inheritance is weakening since land shares are too small to be shared. During the interviews of this study, old persons were asked to compare farmland sizes of the past with present sizes. They stated that 60 years ago when they were children a significant portion of the land was covered by forest and grass – unlike today. The extent of cultivated land had enormously increased over time. In particular, steep slopes and lowlands had not been cultivated earlier.

Older people suggested that the extent of cultivated land at present is larger than during the Imperial and the *Dergue* periods.

iii. *Farming systems in the study watershed*

A farming system is taken to be an organized decision-making unit in which crop and/or livestock production is carried out with the purpose of satisfying the farmers. Farm as a unit, transfers input into agricultural output and which undergoes changes over time. In the process of adapting cropping patterns and farming techniques to the natural, economic and socio-political conditions of each location and the aims of the farmers, distinct farming systems are developed (FAO, 2006). Moreover, a vital factor that has led to the changes in the pattern of LU/LC is the traditional nature (i.e. inappropriate land use) of the farming system in the study watershed.

a. *Crop Production*

Crop production is an important farming practice adopted invariably by every farmer in the Wallecha watershed. Due to shortage of land, farmers are compelled to shift from extensification to intensification by increasing labour and other inputs. However, poor farmers do not have access to fertilizers due to its high prices. It is revealed in key informant interview, (Woysha Wonago, aged 68 years), stated that in the previous days growing of barley *(hordium vulgarae*), and *enset* (*enset ventricosum)* in high altitudes is the dominant cropping pattern in the area. But currently in response to the changing climatic condition, declining soil fertility and shrinking farm size peas, beans and wheat are phasing out of the cropping pattern at the expense of sweet potato, taro (*boyna*) and other HYVs. The driving forces for the expansion of "*taro*" would be its resistance to harsh climatic condition, and promising yield in less fertile soil, and its large potential to cover household food supply compared to other cereals.

b. *Livestock Production*

In mixed farming practices, both livestock and crop productions are carried out simultaneously. Livestock plays an important role in supplementing the livelihood of rural community especially in those areas practicing sedentary agriculture. Besides, livestock is considered as a means of security and coping method during crop failure and natural calamities. Livestock statistics in all KFAs of Wallecha watershed was 327,615 (*Woreda* Agricultural Office, 2013), but due to increasing human population and shortage of grazing land, per capita livestock was below the optimal size to sustain a sedentary community.

Table 4: Livestock Density in Wallecha Watershed, 2013 (Source: WAO, 2013)

Livestock	Number	TLU*	Density/ha	LSU/ha
Cattle	128,300	128,300	12.68	12.68
Donkey	15134	9837.1	1.49	0.97
Horse	5265	5265	0.52	0.52
Mule	4572	5257.8	0.45	0.52
Sheep	78,568	11,785.2	7.76	1.16
Goat	56,795	8,519.25	5.6	0.84
Poultry	38,981	194.9	3.85	0.19
Total	327,615	169,159.25	32.35	16.88

** TLU values are given as each cattle = 1, mule = 1.15, horse = 1, donkey = 0. 65, sheep =0.15, goat = 0.15 and Poultry = 0.005 (Ramakrishna and Asefa, 2002)*

Based on the livestock census stated in Table 4, the aggregate stocking level (16.88 LSU per hectare) was more than the carrying capacity of the study area. According to FAO, (1986), the size of grazing land required per livestock unit (TLU) is 1.5 ha. If we consider FAO's estimate, the total grazing land required to the number of livestock unit in the study area should be 253,738.87 hectares. This is more than 25 folds from what is currently available in the study area (10,116.72 ha).Therefore, in order to support the present livestock population in Wallecha watershed need additional 243,622.15 hectares of grazing land. Perhaps, the number of livestock is increasing with the population that resulted in extremely devastating effect on vegetation and soil quality in the watershed.

According to 62 percent of the respondents, the main factor behind the shortage of livestock feed was the expansion of cropland, 18 percent claimed it was the expansion of gullies, while 20 percent claimed that drought was the major cause. Generally, livestock grazing system is based on the cut-and-carry system, utilizing maize leaves and stalks and chopped *enset* leaves and stems as well.

From the ongoing analysis it was evident that the grass lands are over-stocked and deteriorated beyond the carrying capacity and it became the major cause for severe environmental deterioration in the watershed. This condition further aggravates condition of over grazing and soil erosion on the rangelands. The condition was clearly seen in the analysis of satellite images that shrubs and grassland has decreased by 15.62 (1.35%) per annum during the studied period from 1984-2010 on the same watershed by (Barana B. *et al.*, 2013).

iv. *Driving Forces for LU/LC Change in Wallecha Watershed*

LU/LC change is the result of the interplay of a complex set of drivers that range from natural processes to human intervention. Ethiopia has made three national population and housing surveys in 1984, 1994 and 2007. The population size of the watershed was 25,925 in 1984, 36,006 in 1994, and 59,026 in 2007. An attempt was made to estimate current population size of the watershed and it is found about 68238. The growth rates were calculated on the bases of exponential growth with the growth rate of 3.28, 3.8 and 2.9 percent between 1984-1994, 1994-2007 and 2007-2012 respectively (Table 5; Equation 1). Between 1984 and 2012 the population size in the watershed increased from 25,925 to 68238 which imply that the population more than doubled in size within 28 years. The age dependency ratio was 102.8 percent of which the young accounted 97.57 percent and 4.85 percent for old aged. This indicates that nearly half of the population is young and economically dependent. Hence, human pressure on land resources is not only high but may also continue to be high in the likely future.

Table 5: Population size of Wallecha watershed between 1984 and 2012.

Year	Population Size	Growth Rate
1984*	25925	-
1994*	36006	3.28
2007*	59026	3.8
s2012**	68238	2.9

The growth rates were calculated on the bases of the assumption of exponential growth:

$$r = \frac{(1/t \text{ Log } P2/P1) \times 100}{\text{Log } e} \quad \text{.......Equation 1}$$

Where r = growth rate; e = approximately 2.72; P1= initial population; t= no. years between P1& P2; P2=final year population

Change in population size is the result of either natural increase or in-migration. As can be seen from Table 5, the rate of population increase in the study district has been considerable. Wallecha watershed encompasses Bodity and Shanto towns, which are the market and administrative centres. This eventually triggered the inflow of population to the town. It is evident that at present many developing countries are experiencing fast rates of urbanization, which is partly explained by population increase. Ethiopia is also experiencing a similar trend. One of the measures of urbanization is population size. This fast increasing population is resulting in mounting need for forest and other natural resource products such as wood for fuel, construction. Thus, the unprecedented urban population increase has resulted in resource loss and degradation emanating from corresponding increase in demand for natural resources. Apart from the natural growth, migration and resettlements (villagization) program of the then government in 1980s have further pressure on the natural forest and had a great impact. Research findings at international and national levels reveal that population dynamics in combination with other factors have profound effects on land use/cover changes (Bewket, 2002; Aklilu, 2006). Thus population growth was certainly the greatest driving force in the observed land use/land cover dynamics.

The land tenure issues in Ethiopia in general and the study watershed in particular is uncertain about farmers' security of rights to the land which in turn led for short-term needs than long-term yield. Moreover, the land tenure system which prevailed after the 1975 land reform gave land users use rights only (Daniel, 2008). This resulted in ecological damage, inappropriate or over-intensive land use and poor land management practices that aggravated LU/LC change. Perhaps, it is an imperative for policy making to design an incentive structure that would reduce forest clearing as access factors are improved and consider land tenure systems that improve security of title to and ownership of land for local communities.

High population pressure, which in turn leads to increasing demand for land and trees, poor institutional and socioeconomic settings, lack of land tenure security and inappropriate land use practices were identified as the reasons for the changes. Thus, this study identified tree plantations expansion, communities' crop field expansion, lack of clear land use plan, and change in farming system due to population growth as the causes of the changes. This result is in line with the findings of Daniel (2008) and Abate (2011) in the parts of South Western Ethiopia and Borena Woreda in the last 31 years in the Southern Wello respectively.

v. *Implications of LU/LC changes in Wallecha Watershed*

The LU/LC is inevitable; that it was occurred at all times in the past, are presently ongoing, and are likely to continue in the future. The changes in LU/LC in the study watershed have both positive (degrading) and negative (enhancing) impacts on particular environmental and ecological changes of the watershed. Potentially, LU/LC may have **positive** changes and it is partly socially acceptable by the people in the study watershed to fulfill their livelihood. The changes also lead to improvements in soil management and increase in the value added to the land with the increasing population pressure. It was reported that many people plant trees to stop the expansion of gullies into their cropland and grazing areas and thereby they also met their household needs for fuel wood and other necessities. Based on the satellite image analysis on the same watershed, from 2000 to 2010, 61.8 percent of degraded lands were changed into cultivated land (Barana B. *et al.*, 2013). The responses refer to the rehabilitation measures due to the scarcity of cultivable land taken by farmers to alleviate the adverse effects of LU/LC change on their livelihood and the environment. These implications are in a good agreement with that of Daniel (2008) the case in the Upper Dijo River catchment at Silt Zone.

Taking into account the highly erosive rainfall and rugged topography of the terrain in the area, removal of vegetation cover in the landscape affected the hydrological processes and by implication increases the risk of soil erosion. It became clear from the group discussions that farmers are able to identify soil degradation (loss of soil nutrients and erosion) by reduced yields and followed by poor crop performance. Along the high altitudes group discussion with village elders revealed that the increasing need for fuel wood and farmland forest covers were badly damaged beyond natural regeneration rate. Thus alpine woody covers subsequently gave way to short mountain grass covers. Discussion result further confirmed that before 30 years, current cover types (short grasses and remnant bamboo forest) was occupied by highland forests, bush of herbs, thickets that sheltered numerous wild lives; suggesting that the rate of forest degradation in the area was substantial. In addition to field suvey, FGD confirmed that Bamboo *(Arundinaria alpuria),* Kosso (*Hagenia abyssinica*), Kulkual (*Euphorbia abyssinica*) and Zigba (*Podocarpus falcatus*) trees have been under great threat and are highly disturbed and encroached by cultivators. Regarding food crops, beans, peas (*Pisum sativum*) and other cereals and lentils (*Lens culinaris*) are phasing out by farmers due to their vulnerability to climatic conditions and attacks by pests and wild animals. In the aspiration to develop a SLM on the basis of agriculture and other natural resources, one must recognize the use of environment to produce goods and service, that degradation of any biological resource (in this study, reduction in forest and shrubs and grasslands) is not a sustainable practice. In fact, it is the natural resource base that enables many poor people, particularly those living in vulnerable ecosystems, to avert risks and insecurities today by diversifying their sources of livelihood.

From the findings it is recognized that there is a change in the environment which is clearly related to changes in the utilization of the land resources. As the farm households in the study watershed mostly depend on the agricultural sector, the agricultural developments and attempts to improve the livelihood given rise to changes in LU/LC. At times, these changes have beneficial while at other times they had negative and cause adverse impacts on the environment and people's livelihoods.

V. Conclusion

Socio-economic characteristics are believed to be the major determinant factors in land management practices, of which land use/land cover change is one. High population pressure, which in turn leads to increasing demand for land and trees, poor institutional and socioeconomic settings, lack of land tenure security and inappropriate land use practices were identified as the reasons for the changes. Thus, this study identified tree plantations expansion, communities' crop field expansion, lack of clear land use plan, and change in farming system due to population growth as the causes of the changes. In sum, land use change provides many economic and social benefits, but comes at a substantial economic cost to society. Land conservation is a critical element in achieving long-term economic growth and sustainable development. Land-use change is arguably the most pervasive socioeconomic force driving changes and degradation of ecosystems. Deforestation, urban development, agriculture, and other human activities have substantially altered the Earth's landscape. Such disturbance of the land affects important ecosystem processes and services, which can have wide-ranging and long-term consequences. Therefore, sustainable development policies must address driving forces responsible for these changes, not only for the sustainable management of land resources and regional development.

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