CAUSES OF DEFORESTATION AND IMPLICATIONS: THE CASE OF DODOLA WEREDA IN BALE ADMINISTRATIVE ZONE, OROMIA REGION, ETHIOPIA

BY
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DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any university, and that all sources of material used for this thesis have been duly acknowledged

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1. Introduction

1.1. Background of the study

The conceptual meaning of environment may have variation according to emphasis of different disciplines. For the purpose of this paper environment has seen as physical and cultural /human/ aspects. The physical environment may consist: forest, fresh water arable land and grazing land systems etc, (Schnaibirge, 1980:10 and Belay 1992:30). The cultural environment companies the human element especially religion, tradition, beliefs, customs, law, population, science and technology, communication and administrative infrastructures (Bekure, 2003: 2-3). Hence, the cultural environment may have both positive and/or negative impact on the physical environment.

Historically the level and prevalence of the equilibrium state of the ecosystems disruption varies, based on the level of human civilization. That is the major environmental disruption and degradation of forest, soil, grass, water, and other natural resources associated with the economic-growth-and- modernization model; by which the development policies of many LDCs, including Ethiopia, were highly influenced by the western philosophy.

In relation to this, Dejene (1996: 48-50) noted that, since 1957 – 1973, Ethiopia following a pro-capitalist economic policy, adopted three five years plans, and started to operate development projects: large scale plantations agriculture, the construction of dam, IRD projects etc. These largely foreign/donors financed projects and commercial large scale mechanized farms resulted in the displacement of significant numbers of the local people and/or restricting their access to natural resources, causing widespread poverty, health problem, conflict and in general socio-cultural crisis and severe environmental degradation (Workineh, 2001: 283-285, Alula and Piguet, 2004: 15).

Given its history and ancient civilization Ethiopia has diverse cultural resource base and values, large areas, multi-variety agro-climatic zones, as well as being endowed with considerable renewable and non-renewable natural resources (Shiberu and Kefele, 1999:18). Unfortunately, because of a number of factors Ethiopia is one of the poorest

countries on this planet. As Befekadu (2001:22) argued more than 80 percent of its human population still depends on primary economic activities without transformation with poor performance of almost all economic sectors. According to many writers, this situation of the country can be attributed to different internal and external factors. The weakness of the industrial sector and stagnation or even decline of the agricultural sector may be the major ones, causing widespread impoverishment. More specifically different regimes' erroneous policies, priorities, poorly planned project/programs, weak institutions, rapidly growing population, civil wars, and natural hazards made ill-development a fate of this country.

According to *Ketema* (2001: 13) *Bale* administrative zone, where *Dodola* area is found, is divided into 19, Lowlands and Highlands, *weredas* (districts). Areas with high altitudes are characterized by *dega* and *weinadeg*' climatic conditions. Its tropical forests stretched-over: *Dinsho Agarfa*, *Sinanna, Goba, Mena, Angetu, Nensebo, Dodolla* and *Adaba* weredas, as a common share from the East to West directions. As the writer further stated, it is the host of many endemic wildlife (mammals and birds). Moreover, *Genale, Wabesheble, Weyebe* rivers and many springs emanate from this forested and mountainous area. Furthermore, *Adaba-Dodola weredas* share extensive, grazing and fertile arable lands (often blank volcanic soil) with *Kofele* and *Asassa* woredas of *Arsi* zone using the *Wabe (Wabesheble*) river as common boundary from Northern and Eastern directions respectively.

In the study area, the pattern of human settlement, adaptive IKS and the stable natural ecosystems were subjected to significant disturbance as modernization gained prominence or when the imperial government introduced intervention using this approach in many parts of the country.

As Dejene (1996:71) and Alula and Piguet (2004:15) noted, the establishment of CADU in *Arsi* resulted in the eviction of about 5000 peasants and led then to migrate to Bale province. Moreover, such displacement became more intensive in *Adaba –Dodolla* districts when the military government-established large scale mechanized State Farms

namely: *Serofta, Hererro* and *Hunte* sites; introduced villagization scheme, and *Melka Wakena* HEP dam construction in 1980's.

In addition, the traditional eco-agro system was disturbed through the Farm Mechanization Enterprise - tractor and combine harvester rental public service. Currently such service provision is more dominated by private investment. Furthermore, some communities in the forest partly lost the forest products, because of private investment on licensed forest logging and timber production for a long period of time in addition to the firewood, charcoal and non-firewood products production, for the illegal merchants from the central urban area of Ethiopia, thereby, threatened the indigenous tree species such as Hagenia abyssinca (*Kosso*), Podocarpus gracilior (*Zigba*), Juniperus Procera (*Ted*), Olea africana (*Weira*) and others.

The cumulative effect of the displacement, and unregulated forest logging caused pressure on the remaining natural resources. Hence, these peasants expanded their cultivation and grazing to the hillsides, steep slopes and forest areas as coping strategies. In the meantime, unpopular forest and soil conservation activities: afforestation measures and closing forests, of the past and the current governments made the life of the peasants' worse.

Therefore, this research deals with this problem at a micro-level, in some PAs of Dodola district in relation to their exposure to the challenges. The research intends to suggest alternative solutions in order to mitigate the prevalent natural resources degradation in the study area.

1.2 Statement of the problem

The *Dodolla* area is one of the major cereal crops producing sub-parts of eastern highlands in addition to its high potential endowment of the limited tropical virgin forest resources. In the study area the local people and the available physical resources have suffered because of different factors, which led to depletion of the natural resources.

Therefore, the research intends to study, the causes of deforestation and implications in this district.

1.3. The research questions

1. To what extent the forest cover is reduced?
2. What are the causes?
3. What are the main conservation activities in relation to the forest resources?

1.4 Objectives of the study

A. General objectives

General objective of the study is to:

- ❑ To assess the basic causes of deforestation and implications in the study area with all available data and information.

B. Specific objectives

Specific objectives that the research will address include:

- ❑ To assess the state of deforestation
- ❑ To identify major causes;
- ❑ To suggest ways and means of alleviating the situations on the basis of the study outcome.

1.5 Significance of the study

Disequilibria state of many ecosystems is caused by man-made and natural factors. However, the former one is more responsible in Ethiopia, according to many researches

Accordingly, in the study area, causes and consequences of land and forest resources degradation not well assessed. Hence, to mitigate the situations, deserve high consideration to this location-specific study.

Therefore, the study will significantly contribute to the effort being made to fill in the research gap at the micro-level and provide consumable findings as:

1) It will help to show the level of misguided and un-regulated natural resources.
2) It may inform planners in relation to cultural and ecological contextual factors which need to be integrated in the planning and intervention process, to optimize the benefits and to mitigate undesirable consequences.
3) The finding of this study may stimulate other interest as well as will open ways for subsequent research activities wider in scope and depth.

1.6 Research methodology

1.6.1 The study design

In this paper basically a descriptive survey study design was used in combination with qualitative method.

1.6.2 Sampling technique and sample size

a) Selection of the study sites

Dodolla district is divided into 23 rural and 6 urban *Kebeles*/Villages. The two sites namely *Keta-Berenda* and *Berisa* PAs were selected purposely based on their accessibility to the natural forest and towns (wood markets) and the area subjected to land scarcity in relation to the large-scale development project/extensive government farm etc.

b) Sampling technique

The survey was conduct at a community and household levels. The sample households were selected using stratified sampling technique from different strata. Moreover, quota sampling technique to select respondents from 13 *Kettenas* in the two PAs, that is six in *Keta-Berenda* and seven in *Berisa*, in order to get information which was as representative as possible based on the distribution, proportion and location of the respondents.

c) Sample size

Population distribution in the two PAs, includes about 8628 people with 4520 (52.39%) male and 4108 (47.61%) female or 876 households with 782 (89.27%) male headed and 94 (10.73%) female headed families in *Kuta-Berenda*. While, 6280 people which 3375 (53.74%) male and 2905 (46.26%) female or 820 households with 755 (92.07%) male headed and 65 (7.93%) female-headed families are found in *Berisa* village. In general, the total population of the two PAs was 14908 with 7895 (52.96%) male and 7013 (47.04%) female, and the total households were 1696 with 1537 (90.63%) male headed and 159 (9.38%) female-headed households. (see Table 1)

Hence, the total sample size of the household taken from each PA and from each stratified types of household was 10 percent. The sample was taken with equal proportions from each village, block and type of household to ensure representation of the strata. That is, 87 households, out of which 78 male headed and nine female headed families from *Kuta-Berenda*, and 82 households in *Berisa*, out of which 75 male headed and seven female-headed households were included in the survey. Moreover, 39 informants also contacted.

Table 1, Household head and population distribution by sex composition in the study peasant associations

Name of PA	Types of head of household by sex					Population				
	*MHH		**FHH		Total	Male		Female		Total
	No	%	No	%	No	No	%	No	%	No
Keta – Berenda	782	89.27	94	10.73	876	4520	25.39	4108	47.61	8628
Berisa	755	92.07	65	7.93	820	3375	53.74	2905	46.26	6280
Total	1537	90.63	159	9.38	1696	7895	52.96	7013	47.04	14908

Source: *Dodola* District RADO (2004/5)

*MHH = Male headed household

**FHH = Female headed household

1.6.3 Method of data collection

Both quantitative and qualitative methods of data collection were used, from secondary and primary data sources. The use of many kinds of methods (quantitative and qualitative) and different data sources, i.e., survey interviews, individual informant, etc has brought a number of advantages that no single method could have done (Yeraswork, 200:296). Thus, a scheme made up of the following methods of data gathering was planned and administered.

1.6.3.1 Secondary data

In order to have descriptive information about the *Dodola* district such as about the location, topography, population and so forth census report, surveys conducted by the Bureau of Planning and Economic Development of Oromyia Region (OBPED), etc were reviewed. Moreover, *Adaba-Dodola* Integrated Forest Management Project (IFMP/GTZ) and *Dodola* district Rural and Agricultural office relevant reports and written documents were reviewed in relation to natural resources depletion trends, etc for further enrichment and strengthening the findings.

1.6.3.2 Primary data collection

a) Survey method

A structured questionnaire was used to collect quantitative information, opinions and attitudes and others such as land holding size, family size, etc from a sample of 169 households. Therefore, structured interview schedules were used and administered by face-to-face with questions directed to the respondent through three enumerators, who had gone house to house, and during their meeting time.

b) Qualitative method

i) ***Unstructured interviews***: - In order to understand the perception about natural resources degradation, causes and consequences, in-depth interviews were carried out with elders (in the study sites and neighbor village), poor women, youths, individuals (both losers and winners), PA leaders, the staff of the district RADO

ACRONYMS

AAU	–	Addis Ababa University
ADDU	-	Adda District Development Unit
ADFPA	-	Adaba – Dodola Forest Priority Area
BESO	-	Basic Education Strategic Objective
CADU	-	Chilallo Agriculture Development Unit
CD	–	Community Development
CPP	–	Comprehensive Package Projects
CSE	-	Conservation Strategy of Ethiopia
EEPC	–	Ethiopian Electric Power Corporation
EPA	–	Environmental Protection Authority
EPRDF	–	Ethiopian People Revolutionary Democratic Front
FAO	-	Food and Agriculture Organization
FDA	-	Forest Dweller' Association
FHH	-	Female – Headed Household
GDP	–	Gross Domestic Products
GTZ	-	Germen Technical Cooperation
HEP	-	Hydro – Electric Power
HHs	-	Households
IFMP	-	Integrated Forest Management Project
IKS	-	Indigenous Knowledge System
ILO	–	International Labour Organization
IMF	-	International Manatery Fund
IOs	–	Inter – governmental Organizations
IRD	-	Integrated Rural Development
JICA	-	Japan International Cooperation Agency
LDCs	-	Less Developed Countries
m.a.s.l.	–	meters above see level
MHH	-	Male – Headed Household
MoEDC	-	Ministry of Economic Development and Cooperation
MPP	-	Minimum Package Projects
NGO	-	Non-Governmental Organization
OBFED	-	Oromia Bureau of Finance and Economic Development
OBPED	-	Oromia Bureau of Planning and Economic Development
OEPO	-	Oromia Environmental Protection Office
OESO	-	Oromia Economic Study Project Office
ONRS	-	Oromia National Retional State
PAs	-	Peasant Association(s)
RADO	-	Rural and Agricultural Development Office
RF	–	Rainfall
RFPA/NFPAs	-	Regional/National Forest Priority Areas
RLDS	-	Regional and Local Development Studies
SIDA	–	Swedish International Development Agency
SSA	-	Sub Suhara Africa
TEKS	–	Technical Environmental Knowledge System
USA	-	United States of America
WADU	-	Welayeta Agricultural Development Unit
WAJIB	-	Forest Dwellers' Association in Afan Oromo
WB	–	World Bank

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ABSTRACT

This paper has attempted to investigate basic causes of deforestation and its nexus, and to provide some possible alternative solutions.

As elsewhere in many developing countries in Ethiopia in general and in study area in particular the large majority of the population was depend on the natural resources, especially on the land and forest resources. However, these resources often were not used on a sustainable basis. As a result, the study area is characterized by resources degradation. The findings have conformed that deforestation was one of the major environmental problem. While, the ongoing high rate of deforestation was evidenced by the decreasing of forest cover, triggered by locally needed forest products and other functions/purposes of the forest by the communities, including the consecutive deterioration of the land that lost its tree/vegetation cover, due to the processes of soil erosion or denudation.

Moreover, the causes were also divers and interdependent. Among the others uneven distribution of land holdings and dependency on land, unemployment (e.g. landlessness, etc), expansion of farm areas, access restriction, urbanization and increasing of demand for the forest products, expansion of wood workshops and wood markets that have encouraged illegal forest encroachers and wood traders. Furthermore, dependency on the traditional sources of fuel (firewood and charcoal), low level of awareness and lack of acceptance of the conservation laws, low commitment of the responsible government bodies, increasing of population and the like have been also identified as the causes that contributing to accelerate the level of deforestation, under the inappropriate and inadequate conservation activities.

The cumulative effect of the above factors create pressure and led to the decimation of the forest and land degradation which in turn resulted in the reduction of the supplies of the resources and became a sources of competition and conflicts over the scarce forest/land resources. Generally, all these may have bad implications for the quality of the local land resources, which were the basic sources of livelihood and ultimately to the life conditions of the rural communities in the study area.

Key words: Deforestation, Pressure, Conservation, Soil erosion, Tenure, Conflict

lopment Agent's), Teachers', Investor, *Hererro* State Farm
d Experts, IFMP Manager, and Advisor and Representative of GTZ,

Observing location of the settlement, the surrounding natural
of agricultural and conservation practices, the local day to day
addition, content analysis of different recorded materials was also

lata analysis

ined was computed using SPSS (Statistical Package for Social
ed using descriptive statistic such as percentage, mean, etc.
e status of the forest, etc were the major areas of cross tabulation
qualitative analysis also used to understand perception and
rmed people, case studies and direct observation on the existing
ms and the implications and causes of resources degradation.
ation obtained from the data analysis considered in the data

f terms

hich serve the purpose of this work, are the following:

rm applied in general to the positive work of maintenance,
e management of reducing the rate of

Deforestation – Whitton (1984:1136) defined as, the act by which a forest is totally felled and cleared by human activities. Therefore, adopted here as the depleting, net average annual lost of forest resources per hectare resulted by clearing action for cultivation or settlement, inadequate fire control, unsustainable commercial logging or over exploitation, over-grazing, etc. in a given specific area.

Environmental degradation – refers to a visible reduction in the availability of goods and service, both in quality and quantity, from the physical environment and the renewable natural resources base. It is manifested in a number of ways including: pollution, loss of soil fertility or substantial decreasing of land productivity and soil erosion, deforestation, degradation of grazing lands, loss of biodiversity, depletion of fishery resources, and degradation of the urban environment (Laurence and Johnson, 1995: 2, Ermias, 2003:24 and Demel, *et al.,* 2003:11).

Land /tree tenure: The meaning of the term refers to the body rules governing the terms and conditions under which land – including its resources are owned/held, utilized and disposed. Land tenure can be viewed as a rule regime structuring and regulating access to-land, exclusion from land and ownership right or property right to land (Yeraswork, 2000:12).

Soil erosion – is the process of removal and transport of soil by water and/or wind (Moss, et. al, 1996: 87). More, specifically for the purpose of this study, operational definition refers to the loss of soil in a specific unit (e.g. in ton) per hectare/ year in a given area, which is primarily caused by human intervention such as over – cultivation, over – grazing, deforestation, etc.

1.8 Limitations

- **Baseline data:** In-depth and time series analysis was difficult in the absence of annual and reliable data.

- **Structural change**: Some of the relevant institutions has been under structural changes and it was difficult to find resource persons to the respective departments..
- **Election:** The study was carried out on election perspective, where respondents were busy and reluctant. .
- **Location**: It was difficult to get respondents' because of some of the peasant families relocated in the inaccessible areas.

1.9 Organization of the study

The thesis has five parts. The first deals with the problem and its approach. The second part presents the review of related literature. The third part describes the study district and selected PAs. Part four presents characteristics of the sample respondent households, treats the analysis and interpretation of data. Finally, part five deals with summary of findings, conclusions and recommendations.

2. Literature review

2.1. Evolution of environmental problems

As Schnaiberg (1980:23) noted materials are extracted from ecosystems, these materials are altered through physical and/or chemical production process and after production leads distribution and/or use, then the wastes can be disposed in some ways. As such social production induces environmental problems, withdrawals (depletion) and additions (pollution) because additions and withdrawals have the potential to disorganize natural ecosystems. This follows the evolution of human civilization processes, which mean, from very simple form of social production to the current level of modern agricultural and industrial production systems.

To clarify the conditions stated above, in the early stage human societies were involved in hunting and gathering for his/her biological survival as any a species. While, the agricultural revolution, was the initial period in which man able to made simple modification on the physical environment, through the domestication of plants and animals for agricultural production rather than hunting and gathering. Domestication of plants and animals later led to changes in local patterns in: species, populations, communities and ecosystems, in line with the development of cultivation and husbandry. Particularly, the contribution of irrigation systems, etc constituted significant transformation of natural ecosystem to promote situation for man social existence (Woodhouse, 2000: 141, and Demel *et al.*, 2003:9).

According to Schnaiberg (1980:16-17), in general the modification was gradual until the seventeenth century in many areas and still later in others, but in eighteen and nineteenth centuries saw more rapid growth in human populations, in western early industrial countries. That is, in the industrialization era of the last two centuries for the expanded production, the change in production technologies seem more vital.

In light of the above facts, through time progressively man tends to control and manage nature for his own benefits. However, intensive transformation of natural ecosystems evidenced by the drastic population increase, urbanization, industrialization and polluting: land, water and air. In this regard, Schnaiberg (1980: 24-27) further identified different levels of social productions and their degree of impact for the disruption of ecosystems or biosphere as follows:

1/ By gatherers and hunters (with low population densities/numbers)-the environmental impacts are: small biomass or stocks of animals removed; it occurs temporarily; it is not vital, only selected species are removed; and normally a single or limited ecosystem involved.

2/ Settled agriculturalists or pastorlists here there are: larger biomass removal in clearing areas; relative to the above, more permanent effects (reducing of local habitats and elimination of local plants/animals in immediate vicinity); some what vital effects - local communities disrupted; however, often limited ecosystems involved, relatively.

3/ Agri-business and developed industries have impacts that are: severe biomass removal; more permanent; more vital habitat and species removal, reproductive impairment through pollution; and multiple ecosystems disrupted for production needs. For example; modern agriculture: add chemical fertilizers, pesticides and herbicides to land and water; add new animals and plant species, and add animal wastes to land and water bodies through run off, as well as withdraws existing: flora (trees, weeds, etc), predators and rodents (hunting, trapping), and withdraws water (e.g. intensive irrigation).

From the above illustration one may infer that human intervention for production may cause both qualitative and qualitative impacts on different ecosystems. However, the scope and intensity of the impacts may vary according to the scale and intensity of production, and level of technology and management.

According to Woodhouse (2000:141-142), consequences of human production were perceived lately. The conquest of nature in the past time had been considered as necessary and creative action. However, the perception of undesirable effects and threats, started to be understood in nineteen century in relation to the respiratory and intestinal diseases, which resulted from air and water pollution of industrial production.

Shortly, changing awareness from conquest of nature to the deep worries had been made. As a result, as Wright noted (1994:109), the deterioration of soil condition was reported in the 1930's. Then, environmental issues gradually appear as an international issue, for sustainable use of natural resources and to protect the "commons". Regarding this, Litfin, 1999: 332 - 338; Woodhouse, 2000: 141 - 143; and Sachs, 2002: 172) maintain that the first general agreement to protect the "commons": in the early of 1970s, by Stockholm's conference was then followed by the 1980's, and by the 1992 ("Earth Summit" in Rio de Janerio), in 1997 at Kyoto, and in 2002 in Johannesburg. It implies that the critical awareness about the negative impacts of social productions and cooperation to mitigate the challenge as well as concern for sustainable use of natural resources is a recent phenomenon.

As Brown and Porter, (1991: 104-105, 124) highlighted, the politics of most global environmental issues include: the global warming, which is the leading issue, ozone layer depletion, acidic rain, whaling, trade in ivory from African Elephants, international hazardous waste trade, deforestation of tropical forests, erosion of biodiversity and species extinctions, and military activities such as nuclear weapons production, has enormous 'externalities' in the form of nuclear waste that present long-term threats to the environment. It shows that to what extent the deployment of environmentally faulty production systems and other social activities induce threats/damaging effects on the environment.

In this regard, Chanda (2001:245 and 260) emphasized that unlike for the geological past history, the global environment is experiencing more negative changes according to the recent plausible evidences show, which arises principally from human environmentally irrational activities. Most of these faulty activities or productions have

been concentrated in the Northern countries since the industrial revolution, while the Southern countries are accountable largely for localized, basic livelihood related ecological crisis.

Brown and Poter (1991: 128) asserted the above explanation by saying that, "industrialized countries which consume 80 percent of the world is resources, have already used up the most of the biosphere's capacity to absorb greenhouse gas emission." Hence, it can serve as an indicator for the affluence society's high-energy consumption, which has been contributed to the large energy waste and pollution. Moreover, the scale and forms of environmental degradation and causes vary between industrialized and non-industrialized countries; this does not mean that LDCs are not responsible for the global dysfunction.

As described by Woodhouse (2000:16) mercury mining in China, gold mining in Brazil and by small scale chromium mining in India caused pollution of rivers and ground water as well as environmental hazards ultimately, because, the entire project that have been mentioned conducted under poor regulated conditions. This may show no guarantee that small is always beautiful. Thus, not only the scale or intensity of natural resources exploitation determine the possibly occurrence of environmental crisis but also being well planned and regulated operations or not, and other social factors, matters. To this end, we will assess about the natural resources conditions of developing countries by the coming topics and sub-topics.

2.2. Deforestation and land degradation in developing countries

Deforestation, land degradation, loss of biodiversity etc, can be some of the major environmental problems in developing countries. However, deforestation is the leading issue in many developing countries.

Regarding, forest cover of developed and less developed countries, Mather (1987: 1) noted that the global forested area was around 4,130 million ha or 23 percent to 38 percent of the earth's land surface. However, the area of closed forest was

considerably smaller, nearly half out of the above estimate of the total forested area of the earth. As the above author further discussion: Finland, Sweden, Japan and the Koreas forested area cover, was more than 50 percent, while, Africa and South-West Asia has less than 10 percent of their total land area. However, most European countries were characterized by an increase in forest cover and decline in land under agriculture by contrast, most of Latin American and African countries characterized by an increase in agricultural area and decreasing in forestland (Mather, 1987: 1-2).

As a result, most developing countries are losing forestland, and show a net loss forested areas. For example, forest cover change of the most of African and Latin American countries based on the forest resources assessment of FAO in 90 tropical countries, results indicated as follows:

> *The pan-tropical forest cover was 1,756 million ha at end 1990 and 1,910 million ha at end 1980. Thus, average annual deforestation during the past decade amounts to 15.4 million ha (0.8 percent in compound annual rate of deforestation). The largest extent of forest cover was in Latin America and the Caribbean (918 million ha: 52 percent of the total tropical forest area), followed by Africa (528 million ha: 30 percent), and Asia and Pacific (311 million ha: 18 percent. The annual loss of forest cover by region was: Latin America and the Caribbean 7.4 million ha (0.8 percent), Asia and Pacific 3.9 million ha (1.2 percent) and Africa 4.1 million ha (0.7 percent). ...Among the sub regions, the following have relatively high rate of deforestation: West, East Sahelian and South Africa; continental and Insular Asia; central America and Mexico.(FAO, 1992:24).*

Therefore, deforestation is one of the major environmental concerns for developing countries and it is a cause for the forest products crises, susceptibility of soils for water and wind erosions, loss of biodiversity. Moreover, including deforestation, land degradation and following challenges will be reviewed under some selected case studies in detail hereunder.

Table 2. Forest cover areas and rate of deforestation by geographical sub-region

Geographic sub-region/region	Number of countries	Land area	Forest cover		Annual deforestation 1981-90	
		Million ha	1980 million ha	1990 million ha	Million ha	% Per annum
Africa	**40**	**2,236.1**	**568.6**	**527.6**	**4.1**	**0.7**
West Sahelian Africa	6	528.0	43.7	40.8	0.3	0.7
East Sahelian Africa	9	489.7	71.6	65.5	0.6	0.9
West Africa	8	203.8	61.5	55.6	0.6	1.0
Central Africa	6	398.3	215.3	204.1	4.1	0.5
Trop. Southern Africa	10	558.1	159.3	145.9	1.3	0.9
Insular Africa	1	58.2	17.1	15.8	0.1	0.8
Asia & Pacific	**17**	**892.1**	**349.6**	**310.6**	**3.9**	**1.2**
South Asia	6	412.2	69.4	63.9	0.6	0.8
Continental S.E. Asia	5	190.2	88.4	75.2	1.3	1.6
Insular S.E. Asia	5	244.4	154.7	135.4	1.9	1.3
Pacific	1	45.3	37.1	36.0	0.1	0.3
Latin America & Caribbean	**33**	**1,650.1**	**992.2**	**918.1**	**7.4**	**0.8**
C. America & Mexico	7	239.6	79.2	68.1	1.1	1.5
Caribbean	19	69.0	48.3	47.1	0.1	0.3
Trop. South America	7	1,341.6	864.6	802.9	6.2	0.7
Total	**90**	**4,778.3**	**1,910.4**	**1,756.3**	**15.4**	**0.8**

Source: FAO (1992:25)

i) Case studies about deforestation

Tropical rain forest resources identified as one of the resources of poor countries which is under stress. As Brown and Porter (1991:99) the principal causes of world tropical deforestation can be: commercial crop cultivation for export: plantation rubber, palm oil, etc; large scale mechanized logging; mining operations; military activities; construction of dams and roads; cattle ranching and clearing and burning for subsistence agriculture, are blamed. This clearly shows that how deforestation linked with development projects.

Similarly, the *Penan's* (Tribal people in Malaysia) livelihood is based on, hunting and gathering, on forest resources. However, when the government invited large scale mechanized commercial forestry/logging, this destroyed locally needed forest products and the forest animals, were driven away over a longer area by the noise and disruption of logging operations. As a result the local community (the *Panan*) was being forced to move deeper and deeper into the forest to obtain food, herbal medicine, and materials for construction, implements and equipments. As the writers, note the core of

the stated problem was failure to recognize the customary right of the indigenous people to land and forest. Thus, appropriation of forest resources by the state and their exploitation by domestic and foreign logging companies has resulted in the displacement of the local people and the reduction in availability of forest resources (Chai, 1994:4). This implies that policies about the forest and land tenure have contributed to the impoverishment of the local people and degradation of resources.

By another illustration, in Kenya specifically in the *Embu* district between 1970s and 1980s environmental degradation was attributable to exogenous economic factors, which led to affect the livelihoods of communities, heavily dependant on natural resources for their survival. In this district the major sources of deforestation were: the introduction of large scale tobacco growing in the area since 1970; and improvement in local infrastructure, which allowed the scale of fuelwood and charcoal production to increase by the rapidly growing urban dwellers; in addition to the rural local demand for cooking, construction, etc. (Sallen, *et al.*, 1994: 147 - 149).

To sum up, deforestation particularly in the tropical areas may lead to severe soil erosion, species extinction and depleted genetic diversity, threat the survival of several million forest dwellers, and exacerbate induced global warming because of emissions.

ii) Case studies about soil erosion

Soil resources are one of the precious gifts of nature and it is the most fragile resource. Because one centimeter soil to be formed on hard crust surface/rock may require 200-1000 years (Belay, 1992: 48 quoting Enrlich 1977). It shows the need for the proper soil conservation and planning. While, the displacement of landless tenant/farmers into the interior forest land's and/or pushing them to marginal land with steep hillsides, shallow and less fertile soil, lack of moisture /rainfall, etc, has the following effects: their farming escalate soil erosion; reducing fallowing periods; heavy emphasis on chemical fertilizers, pesticides and herbicides, used to boost agricultural production (Brown and Porter, 1991: 12-13, and Seagor, 1993: 122).

cording to Woodhouse (2000:155) a case study conducted in Niger revealed that the progressive expansion of commercial groundnut cultivation from 142,000 ha to 300,000 ha and to 432,000 ha, respectively in 1954, 1957 and 1968, has been occurred. As a result of this, the peasants were forced to move into marginal rainfall areas to cultivate. Those traditionally used by pastorals through rational decision of "transhumance" indigenous resource management (seasonal movement). Thereby, as cited writer further stated the cumulative effect made fallowing insufficient and reducing vegetation that would normally be used for pasture. Consequently, this seriously diminished the resource available for their herds, and led to conflict between the cultivators and pastorals for control of land resources.

Thus, the above case studies may illustrate explicitly how the "Third World" governments have imported development policies/models and projects, that paid more emphasis for its national economic growth that systematically depleted the most critical resources of the rural mass poor people, which take a millennium (soils) to be restored. Accordingly in the following chapter the issues in Ethiopia will be discussed.

2.3 Causes and effects of land degradation in Ethiopia

Land degradation defined as the deterioration of soil fertility, including chemical, biological, and structural properties or the substantial decrease in either or both of an area's biological productivity or usefulness due to human interference (Laurence and Johnson, 1995:2, 23). Although Befekadu (2001:23) defined land degradation as "reduction in the capability of the land to support a particular use", and stated that, it is a major and growing problem in Ethiopia, which is manifested in soil erosion, soil contamination, loss of organic matter, nutrient depletion, acidification etc. For the purpose this paper, land degradation refers to soil erosion and/or loss of soil fertility, especially in the highlands where, the soils often have a high inherent fertility.

Ermias in this regard emphasized that, indeed, soil erosion in Ethiopia has a history dating back at least to the *Axumite* state period, however, by now it reach to be one of the serious environmental problem in this country.

According to Belay (1992:49), most of Ethiopian highlands have very high erosion risks, because of the mountainous topography and the steep gradient. Studies indicate that out of the total area of the highlands 33 percent of the highlands have slop gradient of above 30 percent, and more than 60 percent has gradient of above 17 percent, which mean that most of the highland regions (more than 90 percent) can be categorized into highly to very high susceptible highland areas, to soil erosion.

As a result, in the area with the slopes of over 15 percent, in some areas the erosion reaching up to 400 tones/ha/ annum and erosion causes cropped lands to loss on average 100 tons of soil per ha annually (Demel *et al.*, 2003:11-14) in addition to, the loss in soil fertility. Moreover, pollution of soils often may be resulted from increasing in the use of chemical fertilizers, herbicides and pesticides. In turn, adversely affect the physical, chemical and biological conditions of the soil resources, finally it discourage the plant growth. Generally, according to the recent research works estimate indicates that in Ethiopian highlands erosion causes a loss of a total nearly 2 billion tones /ha/ year, and nationally over 4 percent (Fenta and Yohannes, 2003:59-60) of the country's land area has lost its ability to produce crop, and approximately two third of it, has been seriously eroded.

Thus, it has dangerous implication for the country, where the major economic activity is agriculture (contribute nearly half of the GDP and eighty five percent employment generation, depend on this economic activity).

The major responsible factors of land degradation can be diverse, complex and it vary through time, but also the consequences too. As noted earlier, large part of the highlands including heavy nature of the rainfall has slopes that favor soil erosion as physical variables.

Regarding social environment Wood (1990:191-192) argued that farming practices such as single cropping and more emphasis up on small-seed crops which require the preparation of fine tilt seed beds, acceleration of population growth which caused deforestation, expanding cultivation into steeper slopes, reduced fallowing and diversion of dung for fuel, create population pressure upon the natural resources. As the author further stated, a crucial factor appears to be the political environment for the peasant farmers, having little security of access to land, and have been impovershished by the exploitation of elites, the state and by the poor returns from farming. This implies that poor farm practices, expansion of the farm areas and political factors have been the major causes of land degradation.

In this respect Belay (1992:38) noted that disruption of the physical environmental and land degradation encouraged as a result of the increasing demands for: food, fodder/grass, fuel, materials, etc; the non – resource conserving culture; perception / attitude of the frames; the poor technological level; low level of economic development and the widespread impoverishment; and the irrational government policies, identified as major factors.

Similarly, a recent study indicate that unsuitable cultivation techniques, bad cropping patterns, the abuse of natural pastures and forests, with out the minimum repair, and the like, has resulted in land degradation (Gebremarkos and Deribe, 2001:62).

Moreover, Demel *et al.* (2003: 11) suggested that Ethiopia despite having both non-renewable energy resources (e.g. coal and natural gas) and renewable energy sources (e.g. solar radiation and wind energy), to date most of the energy comes from biomass as sources (wood, animal dung and crop residues). As the above writers noted the promotion of HEP has been expanding but other more modern technologies for harnessing and using other forms of renewable sources have hardly been introduced and diffused. It shows that the pressure on forests for fuel wood and charcoal demand as well as the danger of diverging animals waste and crop residue, as the expense of the soil resources.

As the claim made by Befekadu (2001:23), in relation to external factors stated that despite the fact that Ethiopia contribute the least to the emission of green house gases due to its low per capita consumption of fossil fuel, it is among the most vulnerable to climatic changes, drought. Moreover, vulnerability of the rural mass people is most acute, given its high dependence on rain fed agriculture. So that, this may implies that, how the industrialized countries being responsible for the induced climatic change and its effect.

On the other hand, Seager (1993:233) argued that, "mass starvation in Ethiopia derives not from a natural proclivity to famine, but from yeas of internal warfare, military spending bloated at the expense of social and environmental programs, corrupt governance and regional environmental degradation." Likewise, Shibru and Kifle (1999:), having a similar argument noted that ecological crisis is consider to be the outcome of misguided and unregulated modification of the Ethiopian environment, in particular the forest and wood lands, and the soils and natural ecological processes. Thus, it implies the absence of popular problem solving policy measures and devotion of scarce resources properlly.

2.4 *Causes and effects of deforestation in Ethiopia*

Forest may refers to an area covered with trees and it is often an area with heavy RF. Forest and woody vegetation resources include high forests (natural), wood lands, bush lands, plantation and tree on farms. While, forest coverage serves as the main indicator of renewable natural resources degradation. The higher percentage of land under forest cover the lower the degree of resources degradation (Ayele, 2003:31).

The process of deforestation in Ethiopia has been linked with the ancient history of the country due to the expansion of settlement, cultivable, and pastures lands. However, even if there were well-documented and dependable data hardly available, it is estimated that forests might have covered more than a half of the country land area. In the long past this situation allowed the country to have diverse climatic conditions, to be rich with biodiversity, with several flora and fauna including those endemic to Ethiopia. (Gebremarkos and Deribe, 2001: 62, and Ermias, 2003:24). However, the host of

millions species has been vulnerable to different factors that led to the devastation of natural forest resources and ever diminishing of the forest cover.

Table 3. Ancient vegetation cover in Ethiopia

Vegetation type	Area in ha	Percent
Deciduous and savannah woodland, shrubs and bushes	72,200,000	63
Natural high forests (e.g. highlands and mountain forests)	41,200,000	37
Total	***114,400,000***	***100***

Source: Gebremarkose and Deribe (2001:62) citing Breitenback, 1962

According to the study carried out by Breitenback in 1962, the ancient vegetation cover of Ethiopia was estimated to be around one hundred fourteen million hectares where about 40 percent of the highlands, was covered by natural high forest. However, in 1956 E.C the natural forest was reduced to five million hectares of forestland or nearly 4.5 percent of the total area (Gebremrkose and Deribe, 2001:6)

Pankhurst, (1992:73) had already asserted the above explanation by saying that large portion of the countryside was endowed by dense forest, until it was severely deforested. Likewise, originally 87 percent of the highlands were covered with high forests (Wood, 1990: 187).

However, over the last three to four millennia cultivation has expanded and the livestock population grown causing the forest cover to be reduced considerably. According Ermias (2003:24) and Wood (1990:187 quoting FAO 1986/1988 and EFAP, 1994) deforestation has been accelerated almost during the last 100 years as a result forest cover was reduced to about 16 percent in the 1950s, and less than 2.7 percent in the 1990s. In addition, deforestation rate estimated to reach nearly one hundred sixty thousand ha per year (Markos, 1990: 162).

Moreover, a tropical countries forest resources assessment of FAO (1992:72) indicates, during 1981 – 1990 forest area change in Ethiopia was, about 39,000 ha of natural forests were deforested annually. While, during the same period the annual plantation

was about 17,200 ha. Hence, annual plantation was less than half of the annual deforestation of natural forests in Ethiopia.

Similar, a recent study indicate that the current cover of forest of different categories indicate that about 35,480 km^2; 4,480 km^2 of bamboo woodlands; 23,200 km^2, 200,000 km^2, and 6,000km^2 of mixed deciduous wood land, savanna and river forest respectively (JICA, 1999:21).

In addition, the forest cover is confined to some regions, and the rate of deforestation is also unevenly distributed in Ethiopia. For example in the Southern Region the natural forest cover was about 20 percent before 1976. However, between 1986 – 1990 it was decreased to about 12 percent. While forest in Oromia Region showed no change in area (see annex 7). This implies that totally cleared forested area being high in the Southern Region, but as far as forest of Oromia Region tends to be changed from closed high forest status to slightly and heavily disturbed grades (JICA, 1999:21). Generally, extensive deforestation was seems more severe in the Southern and Oromia regions.

According to the Oromia Region Environmental Protection Authority (2003:7) the vegetation cover of the region include: forest (7%), wood lands (25%) shrubs and bushes (35%) and grass (2%). Some of these genetic resources are peculiar to the region, i.e. out of the total 840 plant species, 30 mammals, 16 bird species, 14 reptiles, 25 amphibians and 6 fish species endemic to Ethiopia, most of them are expected to be found in this region. However, forest and land which serve to satisfy the basic needs of the communities in the region is now deteriorating at faster rate than ever, while, overgrazing also another form of environmental problem that seriously affecting the rangeland ecosystem of the region currently. (OEPA, 2003:8). Moreover, OBFED (2002:17) noted that the deforestation process being carried out overtime in different areas of the region have seriously resulting fast depletion of vegetation cover. Based on the above discussion, among the others, destruction of the natural forces seems the leading environmental issue in the region.

As specifically stated by Fenta and Yohannes (2003:58) the recent wild fire catastrophe destroyed more than 100 thousand ha of forest. It shows clearly to what extent the limited forest resource, including the inaccessible jungle forests are being reduced and disrupted at an alarming rate.

In relation to the causes of deforestation is concerned in Ethiopia different authors have mentioned several causes, which may vary from region to region, and over time. According to Tadesse and Demel (2001:134), deforestation usually followed human resettlement patters that further progressed into the virgin natural forest interior. The authors in their further illustration stated that the expansion of coffee, tea and similar plantation as another cause for deforestation in the Southwest Ethiopia that led to the numbers of large canopies were highly reduced for opening up the canopy and change in the vegetation species structures.

Moreover, Gebremarkos and Deribe (2001: 63) pointed out the different causes of deforestation in Ethiopia. These are lack of proper forest management and utilization, policy, lack of compatible forest proclamation and other legislations, lack of sustainable organization and extension of cultivation to marginal lands by clearing and burning fragile ecosystems.

According to Ermias (2003: 24) factors causing environmental degradation includes: economic stagnation and poverty, poor governance and political tolerance/protracted civil wars, entrenched bureaucracy, rampant corruption, weak policies and inappropriate institutional arrangements, including tree/land tenure insecurity and population pressure. The author in his further elaboration about the issue under discussion stated that in Amhara Region found that about 20,000 hectares of vegetation cover is lost annually, for fuel wood, logging and construction purposes.

Demel, *et al* (2003:11) has also indicated, the underlying causes of deforestation are, closely linked with the vicious cycle of mutually reinforcing factors i.e. poverty, population growth, poor economic growth and the state of the environment. In addition

in this research work also identified some of the gapes in forest and other environmental recourses management in Ethiopia can be summarized as follow.

Among the others: lack of policies, legislation, strategies, action programmers/plans on land use, forest, wildlife crop and livestock; absence of environmental impact assessment practices, inadequate or inappropriate institutional and operational arrangements (e.g. low profile given to forestry); insufficient knowledge /information (e.g. on the amount or area coverage) composition and number/ diversity; disregard of social and cultural concerns and traditional knowledge or lack of incentive mechanisms and benefits sharing for local communities that might encourage them to take keen interest and an active part in the management, and inadequate exploration, research, documentation and use of indigenous wisdom of local people in the management of the forest and other natural resources; insufficient education and training opportunities on components of our environment at elementary, secondary, under and post graduate levels of education as well in short to medium term on-the-job trainings; inadequate management planning and poor monitoring and evaluation system; shortage of resources such as financial, and physical and skilled manpower in the management; insufficient or lack of public environmental awareness and education and the like were some of the major limitations or gaps in forest and other natural resources management in this country.

Turner and Pearcel (1990:344) on their part ,emphasized that many developing countries including Ethiopia have a substantial reliance upon traditional fuels (fuel wood and charcoal) and, to a lesser extent, upon crop residues as their source of energy. For example, Nepal 93 percent, Malawi 92 percent, Tanzania 91 percent, Ethiopia 89 percent, Sudan 83 percent, and Kenya 71 percent etc.

The consequence of deforestation, in turn, indeed can be very complicated and multidimensional in their manifestations. For Wood (1990:187), a major effect of deforestation led to the increased run off which caused accelerated soil erosion and reduced infiltration. Erosion is especially serious where trees cleared from rugged lands and when the removal of permanent vegetation from arable land creates longer

uninterrupted slopes across which water flows build up. Another consequence of deforestation according to the above author is crises of fuel wood. As a result, dung and crop residues have increasingly replaced fuel wood.

With regard to the effects of deforestation Legess (2004:3) also argued that the decimation of natural forests results in the loss of a large number of forest products, drought, flooding, water quality degradation, declines in land productivity, and in turn leading to exacerbate misery and poverty of the rural people. According to the above author, the increased level of carbon dioxide in the atmosphere accompanied by global warming, are due, partly, to the devastation of tropical forest vegetation.

Moreover, as illustrated in Ermias (2003:25) in Amhara Region, alone about 2to 3.5 billion tones of fertile topsoil, is washed away per annum and transported deposited into rivers and lakes because of deforestation. According to Demel, *et al.* (2003:12) reduced vegetation cover and the associated negative impact on land threaten ecosystems for flora and fauna, and thus, for the depletion of genetic resources as well loss in biodiversity.

Generally, forest can be one of the important environmental renewable natural resources. It is a source of industrial raw materials, fuel, wood for construction, fodder, it provide habitat for wildlife's, it is a center of biodiversity and genetic pools, buffer zone, conserve water and soils. They have also aesthetic values and it can also provided attraction for tourism industry growth and development, some species may have medical and socio –cultural values, etc while, deforestation may imply the decline or loss of all the above and other functions of the scares forest resources , and the consecutive multi- dimensional environmental hazards and socio-economic crises in general.

To summarize, the underlying causes of deforestation and land degradation are diverse and complex, their relative roles and interaction differ from region to region but also vary over time and are dynamic. They are influenced by physical, demographic, socio-cultural, economic and political factors, including state policies, strategies and

programmers/projects. Specifically, elevation of the topography, extent of vegetation cover, nature of the RF, soil types and wind can be key physical factors. Among the socio-economic and political determinates: increased demand for food and other natural resources products, poverty, land-use and management practices, and farmers, perception and attitudes. Furthermore, example of inappropriate government development policies (such as insecurity of land and/or tree tenure), and incompatible strategies and poorly appraised development projects/schemes and weak institutions, (e.g. inappropriate conservation activities and measures) continue to influence the state of ecological crisis in this country (Ermias, 2003: 25-26, Laurence and Johnson, 1995: 23 and Fanta and Yahannes 2003: 73). On the other hand, assertions about major effects of deforestation and land deterioration in Ethiopia may include: ever-diminishing of the available forest fuel, wood and non-wood forest products crises, and enhanced loss of biodiversity, loss of soil fertility and escalate erosion which leads to decline of land productivity, food insecurity and hunger, and conflict over natural resources. (Ermias, 2003:28 and Befekadu, 2001:22)

In light of the above arguments, brief explanations about some selected sub-topics such as population and environment, land/tree tenure and development projects, as their relative importance for the purpose of this paper, will be discussed here under.

2.4.1 Population and environment

According to the national and local objective realities the environmental impacts (positive and/or negative) of population growth may vary place to place, with the availability of resources, economic development, the levels of technological and resources management advancements, etc.

In relation to the positive impacts Sahilu (2003:17) stated that in the country where resources are available plentifully and the level of technology is progressed, population growth rate either does not matter or is considered as a positive resource basis.

For example, case study that carried out in *Machakos* district, in Kenya about *Akamba* farmers that shown positive relationship between high population density and investment in technological promotion, particularly in land resources improvement, management, innovation and know how, have allowed rural incomes to grow considerably, with improved natural resources conservation, under the interaction of grown population density, increased information and market opportunities. (Teffen *et al.* 1994: 997). Here population growth seen as source of market, labor supply and innovation / as important resource for development.

Similarly, the case study that carried out by Eyasu (2003:74) in Southern Ethiopia at *Kondo Koisha* district, where a population density tends to range between 500 – 600 people per square kilometer showed that, due to soil fertility depletion, farmers expanding organic soil fertility enrichment strategies in line with population growth. That is, by expanding and creation of plots, which is enriched its fertility or productivity by combining crop rotation with intensive organic materials use and gardening, to which farming system have evolved towards a type of multi-storeyed garden planted with a range of new income generating crops such as fruit trees or ginger. (Eyasu, 2003: 74). This area-specific study finding may confirm with the above arguments. Hence, it may indicate that under all conditions population growth not necessarily lead to create harmful effects on the forest and other environmental resources.

On the other hand, based on the overall development status of the country others argued that Ethiopia is a predominantly rural country and has agrarian economy, where eighty five percent of the people living in the rural milieu and highly depend on environmental renewable resources. Here, not only a large population with law productivity but also the concentration of large human and livestock population in a limited area, particularly in the highlands. This heavy concentration of population has had major impact on farm size, which averages less than a hectare per household. Hence, size of farmland is insufficient to produce enough food to sustain the family using existing technology. As a result, more than half of the population is food insecure. In addition, this food insecurity coupled with the transitory insecurity caused by drought

and other variables, increases the food deficit resulting in under and malnutrition (Befekadu, 2001:24).

The detailed consequence of population pressure in different poor "Third World" countries is illustrated in Turner and Pearce's research works. The increased demand for more agricultural land, timber production, fuel wood and for other uses, the tree cover is reduced, so the stock of trees diminishes as the forest resources is over exploited rather than being managed on a sustainable basis. This led to fuel wood scarcity and the diversion of animal dung from its traditional role as soil nutrient, to direct burring for fuel, while the reduced dunging of the land and soil erosion caused by trees cover clearance or succeeded deforestation, further impairs soil fertility. This in turn, promote the water run off which takes soil from the land to produce sediment in rivers, polluting drinking water supplies, raising water levels, reducing the capacity of hydropower reservoirs, and aggravate flood hazards occurrences (Turner and Pearce, 1990: 142-143).

Markos (1990:162) in the meantime, before one and half decades age in his research work similarly warned that in Ethiopia the progressive destruction, of trees and shrubs due to growing demand of fuel wood, wood products for construction, agricultural implements and the like, sets the pace for accelerated soil erosion and progressive deterioration of the productive capacity for food and energy supply in Ethiopia. Moreover, Markos further noted that when these losses are viewed against a background of the stagnation of economic development, technological innovation and uneven distribution, likely to lead to a grave displacement of large populations.

To conclude based on the above discussions under some situations i.e. under the low level of resources management and economic development and other mutually reinforcing factors; it may be argued that fast population growth has its own contribution for the decreasing of forests in Ethiopia but not in all the places and conditions.

2.4.2 *Land / tree tenure policies*

In Ethiopia before the revolution the customary tenure system was not uniform through the country, for instance, in *Wollo* and North *Shoa*, both the *gabbar* system and the free hold survived side by side while, in the Southern parts of the country when the *Hailesselasse* government rebuilt a system of land taxation to raise cash revenue, the old *gabbar* was reduced to an dispossessed tenants and freeholder (absentee landlord). However, in the late 1960s and the early 1970s, the expansion of mechanized commercial farming began to gradually replace landlordism. Especially in the south regions of the country where land has been privatized, this led to the eviction of tenants and thereby provides an opportunity to intensify the call for "land to the tiller" (Yeraswork, 2000: 99-100).

In this regard, Dessalegn (2004:1) noted that the land reform of the military government abolished all customary rights to land vested in the state power to redefine rights of property and access to land as well as distributed the land to peasants. Moreover, as Fenta and Yohannes (2003:66) argued the land policy, proclaimed by the *Derg*, which put an end to landlordism, rather worsened the situation. Indeed, it did very little to meet the real needs of the poor farmers, especially the peasants and the people in general what were not the owners of land. Peasants were given nominal use rights; rather the state became owner of the land.

Yeraswork (2000:99) by a similar argument asserted the above explanation by saying that, "The proclamation of March 4, 1975, which provided for the nationalization of all rural lands, dissolved the tenant-landlord relations as well as all vestiges of customary tenures and privileges. It replaced with the framework of state ownership of all land". Thus, the *Derg* land reform changed radically the indigenous diverse land/tree tenure systems and created in effect, lack of a sense of ownership and unpredictability of right holding, tenure insecurity.

On the other hand, the present government land policy also claimed in having many similarities to the land policy, which was following the downfall of the feudal regime. Land is here defined as the property of the people but is administered by the government. In effect land is still a property of government. Thereby, peasants have only user rights land cannot be sold, not used for collateral purpose. However, the current policy in its relative difference when it is compared with the *Derg* land policy allows the hiring labour power, sharecropping and short term leasing. The present policy also allows the transfer of land to one's heirs but some "regions" (e.g. Tigray and Amhara) have put conditions, as if a person continued as a residence of that particular rural *Kebele*, while all of these were prohibited by the military regime policy. Moreover, the threat of periodic redistribution has been reduced only in the Oromia legislation of 2002 (Dessalegn, 2004:3).

It implies that the two governments land polices almost for the last three decades except miner difference, resulting more or less similar adverse effect on the land and forest resources.

According to Yeraswork (2000:14), the stability of a tenure system may contribute to the emergence of secure and predictable rights of land holding, which is one of the necessary conditions for land-users to be motivated to invest in the improvement of the resource.

Nevertheless, since the land reform of the post-revolution, peasants have been denied secure rights to land resources. The present land policy has not changed the worse situations much as the result of a central contradiction between equity and security, aspects of the policy. Absence of stable land-tenure conditions: ambiguity, challenges of redistribution and the leveling down of land holdings caused insecurity and limited incentives to invest in the resource and to manage there property. Moreover, the two governments' land policy environments' significant consequences forced the small land holders to be reluctant or to abandon sound indigenous farm practices or TEK such as crop rotation, fallowing, the practice of letting organic matters in the field and other similar practices. Rather, people were encouraged to exploit the land and the forests

unwisely and carelessly (Dessalegn, 2004:12-18, Yeraswork, 2000: 92, and Fenta and Yohannes, 2003:67 -68).

Thus environmental degradation, especially the high rate of deforestation and soil erosion in Ethiopia, have significant relationship with land/tree tenure policies for the last three or four decades. Saying this, the impacts of some development projects can be assessed following to this.

2.4.3 Development projects /schemes

In Eastern and South Africa, especially in Ethiopia, the agricultural sector is a primary source of livelihood for the large portion of the population; depend on the renewable natural resource bases and peasant farming systems had been mostly managed with no or little industrial inputs sustainably (Regumamu, 2001: 217 and Shibru and Kifle, 1999:18-19).

While, since the late of the 1950s the state administration in Ethiopia started to be influenced significantly by foreign philosophy through inter-governmental organization. In line with this Ethiopia adapt the three five years Marshal Plan following pro-capitalist economic policy framework for the first time. (Dejene, 1996:33) Moreover, above author further stated that the situation provided opportunities for the expansion of transportation and communication infrastructures, and large scale mechanized farms both for export and domestic markets such as coffee and tea, especially in the *Awash* Valley, *Setit Humerea* and other Rift Valley areas. However, these large-scale establishments have been also caused serious restriction of access to resources and displacement of the local people living in these areas.

In this regard Alula and Piguet (2004:15-16) noted that development induced displacements /restrictions of access to renewable local natural resources, aggravate more the disruption of traditional pattern of farming system and competition over scarce resources and disputes, overgrazing, etc.

Ayalew (2004:251) by his location specific study asserted the above arguments by saying the expansion of large-scale development projects in *Karrayu /Matahara* area caused the eviction and dislocation of the local people. Forcing them, to search space for new settlements in the marginal /more fragile areas of the region. Hence, their retreat to the periphery implies the progressive diminishing of the available resources and possible threats.

As discussed above, including with some other factors, successive state development interventions fail to recognize the communal/customary land tenure system of pastorals, which is eco-friendly and reflects rational utilization of resources through their seasonal herd movement, to use the pasture grown by the rain season versus near the rivers. This led to the displacement of the exodus pastorals, causing serious environmental problems and depletes the indigenous institutions and TEKS (Abdi, 2001: 69-70). Thus, pastoral peoples' displacement because of state development interventions also has a great negative impact on the environmental and cultural resources, in the lowlands of Ethiopia.

On the other hand, when we assess the Ethiopian highlands forest/land resources conditions in the contexts of different regimes, development policies and projects, the situation seems more severe, given ruggedness of the topography and very large potion of human and animal population concentrated in the highlands of the country and being the small land holder peasants predominant.

Mulat (1999: 3) stated that in the early of 1960s community development (CD) projects, were a major focus of the international development assistance while during the early 1970's the concern include the idea of distribution. This concern gives rise to two new development assistance approaches. Namely, integrated rural development projects (IRD) and basic need programmes by the inter-governmental organizations (IOs), to direct its effort towards improving the productivity and welfare of the rural poor in the poorest countries including peasant families in the highlands in this country. However, IRD projects in Ethiopia beyond their insignificant positive impacts, but also induced the dislocation of large number of peasants. For example, when CADU established in *Arsi* between 2,500 - 5,000 peasant households (Dejene, 1996: 70-71, Workineh 2001: 285

quoting Cohen, 1987) were evicted, who later migrate to *Bale* (Alula and Piguet 2004:15).

Moreover, mechanized farming which was initiated by domestic policy also caused livelihood insecurity, exploitation and eviction of peasants as well as soil degradation and deforestation (Workineh, 2001: 284 quoting Stahl, 1974, Cohen 1975 and Koehn, 1982). It shows that the introduction of inappropriate technology (imported and costly) to replace the locally available labor and animal power.

In the post-revolution period the promotion of state farms and later some private investment in agriculture, have also displaced local people who had been living on the land. The study conducted by Workineh (2001:284) in *Gumaro Abo* area revealed that hundreds of peasants were displaced from their original homestead; the State took the land of the farmers', and planted tea and eucalyptus trees. As the result, peasants forced to overexploit the remaining natural resources.

Due to the expansion of state farms between 1977 and 1980, some peasants in *Gojjam*, *Arsi* and *Bale* were displaced from their lands and relocated elsewhere, as a result, large amount of areas were deforested and exposing the land for soil erosion. Moreover, villagization campaign (1977 – 1979) of the *Derg* regime was also responsible for the destruction of the limited forest and soil resources of the country more than any other factors if the impact is measured, related to a time framework. In addition, the downfall of the military government and the coming of EPRDF in 1991 provide the golden situation for some families to go back to their original settlements which mean that another round they engaged in rebuilding of houses. Such building and rebuilding houses aggravated deforestation and soil erosion, as resettlement programmes in Ethiopia (Fenta and Yohannes, 2003: 69 – 70).

Based on the above arguments one can infer that different regimes' unpopular development policies and priorities, and poorly designed projects/schemes in Ethiopia have associations with deforestation and land degradation.

3. Description of the study area

3.1 Physical conditions

i) Location, topography, soil and climate

Dodola district is found in *Bale* Administrative Zone in Oromiya Region, which is situated about 320km south of Addis Ababa. It is located at the north part of the *Bale* Mountains. Astronomically, the area extends between latitudes 6^0 50'N and 7^0 00'N and longitudes 39^0 07'E and 39^0 22' E (Asfawossen *et al.*, 1997:5). The district covers an estimated area of 1430km sq.

The area has mountainous, rugged and plain land features. The northern half part has a plain land, with an average altitude of 2400m above sea level and devoid of vegetation, while the southern half part is mountains, with a maximum elevation of more than 3700m above sea level and natural high forest covers (IFMP, 2002:2).

Based on the geological report the soils found in the study area had volcanic origin, basically basalts and ash flow tuffs rocks as parent materials. The soil types were Vertisol (with high clay content, black/brown color and a loam types of soil texture), Ferralosols (rich in clay and red in color), Leptosol (red in color and very shallow depth) and, etc. (Asfawossen *et al.*, 1997:29).

Regarding to the climate conditions of the area, the annual temperature in the area ranges from 7^0c to 24^0c and the average rainfall is 733mm (metrological data of 1994-2002) (IFMP, 2002:89-109). As the traditional Ethiopian agro-climatic classification, the agro-climatic zone of the area may be categorized into *Wurch*, *Dega* and *Weynadega*.

In *Dodola*, the *Wurch* (cool), *Dega* (Temperate) and *Weynadega* (Sub-tropical) agro-climatic zones cover 1 percent, 91 percent and 8 percent of the district respectively (OBPED, 2000: 59). Having two rainy seasons per year/bimodal.

ii) Vegetation, flora and fauna, and water resources

The study area is the sub-set of *Adaba-Dodola- Lojo* Forest Priority Area (ADFPA), which is in turn an element of the 58 National Forest Priority Area (NFPA) of Ethiopia with closed natural high forests, adjacent to the *Bale* Mountain National Park and *Mena Angetu* NFPA. According to BPEDO (2000: 59) *Dodola* district had wide natural vegetation cover, which range from wooded grassland to Afro-Alpine and man-made forest.

Hence, physical conditions allow the area to be endowed with diverse and endemic flora and fauna, such as: *Zegba* (Prodocarpus tree), *Tid*, (Juniperus tree *Kosso* (Hegenia abyssinica) *Weira* (Olea), *Asta* (Erica), *Gerare* (Accacia) along the river etc, were some of the tree types. While, *Menelik's* Bushbuck, mountain *Nayala*, Ethiopian Wolf, Fox, Colobus Monkey, Leopard and so forth, were some of wild animals associated with this vegetation. In addition, there were diverse and unique species of birds (Stuart, 2002, 43-45). Moreover, several rivers and streams originate from the mountainous part and drain to the *Wabe Shebele* River, which serves as boundary between *Bale* and *Arsi* zones.

3.2 Population and settlement patterns

According to CSA (1996:96), the total population of *Dodola* district was 126,495. As far as the population age structures: 0-14, 14-64 and 65 and above years were 51.4 percent, 45.3 percent and 3.3 percent respectively. Females were 52.2 percent of the total population, moreover; about 85.9 percent of the population lives in the rural area, in 1997 (OBPED: 2000:59). The information that compiled by *Dodola* RADO, in 2004, revealed that about 92 percent of the people were from *Oromo* ethnic origin, about 6.1 percent and 1.9 percent, from *Amhara* and others social groups, respectively.

Based on the information obtained from the district Rural and Agriculture Development Office, according to the traditional the major settlement patterns in the study area may be classified in to two. More specifically, in the first major pattern of rural settlement

found in the higher altitude that range 2800 – 3700 m.b.s.l. In these areas agricultural activities dominated by, especially towards upper part southern edge namely around *Osse-Berrille, Aluma-Shiffa* and *Arena* which is adjacent to *Mena –Angetu* and *Aloshe-Batu* and *Dinsho* National Park, the basic economic activity was animal husbandry (sheep and cattle). Households parallel to the above activity harvest forest products such as honey from wild been and hunting wild animals (before such activity prohibited by modern laws), shifting cultivation, colleting fruits, etc. Moreover, partly mixed farming system were commonly practiced as we move towards the lower elevation of the area, here barley was a dominate crop.

While, the second major settlement pattern that found was relatively in the plain and plateau sub-areas with elevation that range between 2400-2800 m.a.s.l, here wheat, *teff*, barley, etc the main crops, including rearing cattle's as a mixed farming system. In this area mechanized farming by government and private sector was practiced. Moreover, large majority of the human population live in this area, nearly more than 90 percent, while more than 70 percent of the total area lays on the first pattern of settlement. This indicates high population concentration/ distribution in the lower settlement area.

3.3 Economic activities

Agriculture, subsistence mixed farming system i.e. the combination of crop production (dominate) and livestock husbandry, was the major sources of livelihood. Wheat, *teff* and barely were the main crops grown in the study area. However wheat was dominant, relatively in the lower altitudes, including *teff* and other type of cereal crops, while barely was common in the higher altitudes. Livestock farming system was also more practiced in the higher altitudes, especially sheep and cattle rearing. In addition, mechanized farming was common in the plain area.

Based on the regional report, in 1997 there were 53,958 member household in 19 Peasants' Associations (PAs) and some others 43,154 member households in 19 PAs

in the adjacent district (*Adaba*), whose livelihood entirely depend on the local land and forest resource, about 95 percent on mixed and 5 percent on livestock farming systems (OBPED, 2000: 53-59).

3.4 Infrastructure services

Regarding, economic and social infrastructure services, *Dodola* had about 93kms of all weather road, one telephone station and one post office. There were three urban centers supplied with hydro-electricity in the district. Firewood was the main source of domestic energy in the area. About 40 percent of the total population in the district was supplied potable water. Moreover, in the district there were about 32 elementary (first cycle), three junior (second cycle) and one secondary and preparatory schools, with 12,532 students and 468 teachers. There were also one health center and 12 clinics with one doctor, eight nurses and 44 health assistants, and one veterinary clinic. (OBPED, 2000: 60).

4. Analysis and interpretation of data

This chapter deals with the analysis and interpretation of data, about the condition of forest and land resources that were under serious degradation and factors. The relevant information were collected through structured interview from household heads and in-depth interview carried out with elders, youths, leaders of the villages and Development Agents in both PAs, and elders from the neighbor communities.

Discussion was also held with the *Dodola* district Rural and Agricultural Development Office (RADO) concerned personnel; *Adaba – Dodola* Integrated Forest Management Project (IFMP) Adviser and GTZ Representative, and Project Manager; *Hererro* State Farm Manager and experts; Investor; and Teachers. Moreover, the investigator observation and recorded documents about the situation of natural resources and information from different reports also used to support the analysis.

Out of the total 169 intended respondent household heads to which the structured interviews were presented, 51.5% and 48.5% in *Kuta – Berenda* and *Berisa* villages respectively collected the interview. About 90.5% were male-headed households (MHHs), and only 9.5% were female-headed households (FHHs) respondents, because of their small proportion in the two PAs.

With regard to educational status, 65%), 20%, 8% and 6.5% were illiterate, between grade 1 and 4, between grade 5 and 8, and grade 9 and above, respectively. Moreover, 69.8% and 29.6% of the respondents were from Muslim and Christian religions, while, 0.6% from others.

Table 4, Family size of the sample respondents

Sex of the respondents	Descriptive statistic							
	Mean	N	Std. deviation	Median	Sum	Minimum	Maximum	Range
MHH	9.07	152	4.453	8.00	1379	1	25	24
FHH	5.31	16	2.358	4.50	85	2	11	9
Total	***8.71***	***168***	***4.433***	***8.00***	***1464***	***1***	***25***	***24***

Source: Owen survey (2005)

As shown in Table 4, the average family size of the respondent households was 8.71 per family. This may depict the large number of people supported by small land holdings. Moreover, Muslim households tend to have large family size, which was 9.55 per family, while; Christian households have 6.74 average family size (see Table 5).

Table 5, Family size of the respondent by religion

Religion of the respondents	Descriptive statistic							
	Mean	N	Std. deviation	Median	Sum	Minimum	Maximum	Range
Muslim	9.55	118	4.847	8.00	1127	1	25	24
Christian	6.74	50	2.284	7.00	337	2	11	9
Total	***8.71***	***168***	***4.433***	***8.00***	***1464***	***1***	***25***	***24***

Source: Owen survey (2005)

Based on the data in Table 6, the respondent's duration in the area was about 30 years and above was 89. %. Hence, it implies respondents have long stay in the study area and are able to provide the required information about the natural resources depletion trends.

Table 6, Duration of sample respondents in the study area

	Frequency	Percent
Below 10 years	2	1.83
Between 10 and 19 years	4	2.36
Between 20 and 29 years	13	7.69
Between 30 and 30 years	30	17.75
Between 40 and above years	120	71.00
Total	***169***	***100.00***

Source: Owen survey (2005)

4.1 The process of deforestation

i) Experts perceptions

In this case experts' refers to government and NGOs subject matter specialists. Professionals express the process of deforestation from the quantitative and qualitative conditions of the forest resources. That is, using terms that revolve around the

composition, area, density, etc of the forest. Accordingly different perceptions of the experts can be summarized as follows:

Among the others, Hagenia abyssinica, Juniperus procera, Podocarpus falcatus, Olea africana, Erica arbora and the like were some of the dominant tree types. However, the distribution, composition, density and quality of these tree types progressively decreasing. Several canopies were exposed to high disturbance due to human intervention, or unregulated access, to the extent that threatens some indigenous tree species.

In relation to this, the district Rural and Agricultural Development Office staff mentioned that currently Hagenia trees found in small quantity and only in some places under scattered condition at the higher altitudes, around 3000 m.b.s.l or above and in the inaccessible areas of the natural forest in the study area. While at a present wildlife in and around this area is very limited. Moreover, the Forestry Team Leader emphasized that severe destruction and highly disturbed canopy of Olea africana were found around *Lajo* area and in this area deforestation was encouraged by the displacement of peasant farmers due to the hydroelectric dam and station construction.

According to the integrated forest management project office, the total forest cover by the year 1973 was about 140,000 ha while around 1990 forests cover was reduced to 53,500 ha with a deforestation rate of more than 3 percent.

Figure 1. The existing condition of the natural forest at Bera'a peasant association (200[illegible]).

This implies the extent of fast destruction of virgin forest resources in and near to the study area because of human interference that led to approximately 50 percent of the total forest coverage being cleared up with in two decades only.

By contrast on the basis of information obtained from district Rural and Agricultural Development Office (RADO), out of the total 53,500 ha natural forest coverage in the two adjacent districts approximately 35,000 ha of natural forest, and 2,200 ha community forest and 1,200 ha plantation state forest were found around 1990. However, the community forest, which was more of *Bahir-zaf/* Eucalyptus, had been destroyed during the downfall of the *Derg* regime and in the transitional government period.

While plantation state forest was entirely dominated by *Yeferenj-tsid* /Cupressus, (poor adaptation to the local environmental conditions) and some other non-indigenous tree species. This not only insufficient to the scale of the natural forest consumption/destruction, replacing the indigenous tree species (which grow/matured within many years) with the imported tree species, may indicate incompatibility of these non-indigenous tree species products and other functions for the people needs and values or to the local people-nature relationships/adaptations built through several generations, and to the local ecological context, which may led to affect the stability of the forest and other ecosystems.

Moreover, out of the total 169 survey respondents, about 40 percent of the households did not have their own trees, which they have planted on their homesteads/ wood lots and around their farm plots. While, 60 percent of the families have private trees that ranges between 2 to 1000 numbers of trees, which was entirely Eucalyptus trees with less than 6 trees on average per family. This not only insignificant in number but also it is Eucalyptus tree species.

On the basis of experts perceptions deforestation might have been seen from the point of views of being the forest coverage, density and quality diminishing over time because of open access and based on the objective of the forest to be protected and

wild land preservation. Generally the perceptions of experts implies their focus only on the conditions of the forest, while this may have undesirable results that can contribute for the disruption of the traditional people – nature relationships and led to degradation and create socio-cultural, economic and political problems.

ii) Perception of communities

The forest had diverse functions/purposes for the local people. It is source of their livelihood under subsistence way of life based on their cumulative experience. While in the locality from time to time the decreasing of the functions of the forest taken as an indicator of deforestation.

According to the elders of the communities the forest for the local people was a source of wild food/fruits such as *Agamsa/Agam* (Carissa edulis), *Kosheemi/ Koshem* (Dovyalis abyssinica), *Kachamsa/Kachamo* (Myrsine africana), *Gorra/Injorre* (Rubus apetalus) and others.

Moreover, they have been also gathered their food through hunting wild animals for food such as *Gedemessa,/Agazan* (Greater Kudu), *Borofa/Dekkula* (Bushbuck), *Kurphe/ Midaqwa* (Bushduiker).

The farmers has indicated that in their locality traditionally trees like: *Ejerssa/Weira* (Olea) locally was used as a preferable source of firewood, smoking wood for the milk flavoring purpose, agricultural tools, sticks and twings; *Heto/Kossa* (Hagenia abyssinca) is a source of herbal medicine; *Areje/Embus* (Allophylus abyssinica) serves as the natural fence around homesteads; *Gerbi/Grar* (Acacia abyssinica) mostly along the local rivers, used as a source of wood for fence, bee keeping, etc. While *Hinadessa/Yehabesha-tside* (Junpiperus procera) was locally used a shade and to produce firewood, houses and fences / construction materials as poles; and *Birbirsa/ Zigba* (Podocarpus gracilior) products used as houses and fences/construction wood, the seeds used to produce local oil for food, and also several types of lower tree/shrubs: roots, branches/stems, leaves, seeds and barks were used to harvest

herbal medicine, based on the indigenous knowledge handed down from generation to generation, and used for the browse purpose.

According to the respondents some big tree species used locally as shade and as symbols of 'god'/spiritual purpose and sites of elders meeting *(oda)*. The forest also used as a place of seasonal migration (transhumance) for those who live in the plain area for grazing purpose during the summer season, because, in the rainy period in the plateau area and relatively areas with law altitude most of lands would be covered by crops as well the forested lands were used as a place of relief for their cattle's, to get pastures when drought years occurred and forest products used as a source of income during seasonal food insecurity (before harvesting time) through selling such as honey, firewood and similar others products of the forest. According to the respondents, in the past those who live in the forest permanently practice shifting cultivation parallel to their other activities.

From this one can inferred that the forest traditionally has many functions and meanings to the communities. Bearing this in mind, then the process of deforestation as perceived by the communities will be assessed.

Table 7 Survey responses about the prevalence of forest depletion

Response	Sex of the respondent		Total
	MHH	FHH	
Very high deforestation.	57	6	63
	37.50%	37.50%	37.50%
High deforestation	52	5	57
	34.21%	31.25%	33.93%
Moderate condition	16	1	17
	10.53%	6.25%	10.12%
Good condition	21	4	25
	13.82%	25%	14.88%
Excellent condition	6	-	6
	3.95%	-	3.57%
Total	**152**	**16**	**168**
	100%	**100%**	**100%**

Source: Owe survey (2005)

Respondents were asked to indicate the current status of the natural forest. Out of 168 valid responses, the majority of the respondents' households about 38% and 34% rated highly degraded and degraded conditions of the forest, respectively. While, about 10% rated moderate condition, 5% and 4% rated good and excellent condition of the forest. (See table 7)

Moreover, 55-year-old informant described the level of deforestation as follows:

> *For example, the land which is located between Keta-Berenda PA and Hererro town, which is devoid of vegetation during the invasion of Somalia (in 1969 E.C.), had been totally covered by natural forest as a result, the warriors' easily keep themselves out of sight in the forest. While, today it is used for settlement and cultivation . . . If you went to see the remaining victimized forest you have to travel several kilometers.*

In addition, Figure 4.2 also may help in order to have clear image about the existing condition of the local natural forest at the remote location that attempted to mention above.

Figure 2, Deforestation around *Keta – Berenda* village (2005)

According to one of the interviewee, the one who stays more than 50 yeas in the study area, the process of deforestation significantly perceived in line with the invited large scale extraction of the forest products, in general through time the availability of locally needed forest products decreasing such as wild fruits, honey, wild animals, (which frightened away because of the depletion of their habitat and disturbance) agricultural implements, firewood and other forest products and traditionally expected uses/services. This in turn tend to became disputable issue around *Bucha* village between the logging enterprise management bodies and leaders of the clan/social groups, in the meantime some others, as coping strategy tend to move into the *Arena* area, which mean to wards the interior part of the natural forest.

Moreover, the following explanation by a 44 yeas old farmer from *Berisa* peasant association may give an image how the process of deforestation going on in the study area:

> *When I was young, leave alone Berisa and Burachel areas even the area around Korra River was covered by forest. For example, an area with the name of Tullu Kocho was called Hindessa Hatu Bollo (cavity or hiding place of cattle robberies and a place where they safely kill for meal the stolen animals) due to dense coverage of the forest. Moreover, sub-areas such as Burkitu Ashalicho and Tullu Lolle were entirely endowed by tree species like Hindessa (Juniperus) and Birbirsa (Podo carpus). In addition, in these areas wildlife, especially Borofa (Bushbucks) were found in flock. However, now a day except some of the remnants that you see, which is scattered trees and patches of forest and shrubs . . . already cleared.*

While some of the elders' lacks *wordes* to express magnitude of deforestation. As a result repeatedly and remorsefully mention that extensive deforestation was carried out within the past three or four decades by comparing the current status of the forest with the situation of this resource what was before half a century from their memories. In addition, as seen in the recorded materials several new and dead stumps of trees, and too many standing trees were observed partly had lump bitten out of, as Juniperus and Podocarpus trees without replacement, may confirmed that the above respondents perception about the intensity of devastation of the forest resource, including the on-going land use change i.e., from forest land to grazing and settlement land uses.

Survey responses about in relation to the locally needed forest resources/products availability such as nuts, herbal medicine, agricultural tools, hunting animals, browse and similar products, an large majority 98 percent of the sample households asserted that the decreasing of the easily availability of forest products over time. According to some of informants, women and children traveling from two to four hours for the firewood collection at difficult locations because of ever dwindling of the forest. Moreover, they have reported that decline of springs, especially in the winter season. Generally, for the communities deforestation means that the decline/loss of all the stated and other, socio-economic, cultural and spiritual functions/purposes of the forest.

iii) Summary

Forest can be one of the most important environmental renewable resources. However, destruction of forest may imply the decline/loss of the essential purposes and vital function of the scare resources.

Based on the information obtained from different community member, historically the study area before half a century was covered with virgin tropical high forests, closed canopies of many indigenous trees, including incidental species of plants, and wildlife's. However, from time to time the resource was decreasing. While, the process of deforestation mentioned from the different point of views. Experts' perceptions focus on the quantitative and qualitative statuses of the forest based on the objectives of the resource should be protected and wild land preservation. However, deforestation for the communities attributes to the decline/loss of their means of livelihood, shelter, and its spiritual and cultural purposes. The major variation may revolve around the experts/forest administration that tends to have partially conflicting views with the local people about the meaning of deforestation, which seems only focus on the quantity and quality reduction of the forest.

In a nutshell, the information obtained from the perceptions of different members of the communities and other stakeholders, reports and the recorded materials content analysis were clear indications for the fact that deforestation was going on at an alarming rate and the high degree of several canopies disturbance, including the

inaccessible forests. In consequence, resulting the declining of forest products/services and wildlife's, and threaten the ecologically, socio-culturally and economically important and needed indigenous tree and animal species including some endemic plant species such as Hagenia abyssinca, Olea africana, etc, and exposed the soil through de-vegetation for water and wind erosion, especially in the area with high slopes, hillsides and rugged areas. In turn, this may worsen the life of the communities.

4.2 *Perceptions of different stakeholders on soil erosion*

As far as the land classification, on the basis of data obtained from the district RADO and OBPED, on average around 35 present of the district and surroundings areas is relatively plain land, while nearly about 65 present of the land is rugged terrain which forms part of the Bale massifs, hills, U shaped, valleys, gorges and dissected plateaus. For example, approximately 25 percent of the land, slopes and surface stone cover exceed 30 percent and 50 percent respectively. Hence, the area is characterized by undulating and mountainous land set up, which might be exacerbated soil erosion in the area where more than 700 ha/year of forestland cleared out of the total approximately 35,000 hectares of natural forest in the district. Moreover, on the larger part of the area the soils were shallow due to the underlying ash parent material. Such situations may lead to soil erosion and reduce soil fertility due to the low soil development process.

With regard to precipitations, the area endowed with two rainy seasons in a year, with more than 1200 mm annual average of rain fall 120 to 150 rainy days even more in some surrounding sub-areas thereby, in autumn (*balg*,) March/April – May) peasants had been producing most of the time barley while, in spring (*tsaday*) such as chick-pea (*shenbera*), fenugreek (*abesh*), different spices (*qemam*) types, etc, and the summer season identified as the major rainy time in this area to produce wheat, *teff*, barley, etc. Moreover, the annual temperature ranges from 7^0c to 24^0c. .

However, decreasing fertility of land and considerable soil erosion through water and wind has reported.

Figure 3 Eroded land in *Berisa* village (2005)

In this regard, as shown in Table 8, from the total of 167 valid counts, large majority of the respondents indicated soil erosion to be common challenge in the area. Furthermore, the discussion with informants in the two PAs including Development Agents (DAs) asserted that land productivity was decreasing over time.

Table 8, Survey response about the prevalence of soil erosion

Response	Sex of the respondent		Total
	MHH	FHH	
Yes	147	16	163
	97.35%	100%	97.60%
No	4	-	4
	2.65%	-	2.40%
Total	151	16	167
	100%	100%	100%

Source: Owen survey (2005) * 2 Respondents were not included

According to the resource farmers before four of five decades, under mixed and shifting cultivation, crop-rotation, fallowing, etc they had been able to produce, for example, 35 to 40 or more quintal of wheat per hectares while, now a day they have producing 15 – 20 quintal per hectares. Moreover, the peasants highlight the decreasing of soil fertility on their plots in relation to the reduction of yields year to year.

In addition, one of the agronomists of Hererro government farm about the local farmer's plots from his observation identified that erosion as the main challenge in this area. As the respondent productivity of the land under the government farms have been also decreasing.

As stated in the report of IFMP soil erosion tends to be more than 20 tons of topsoil per hectare per year. While, in the report also noted that based on the information obtained from *Malka Wakana* hydroelectric power station, which is located in the Northeastern part and to which the local rivers drained was under threat from siltation. That is, if the existing rates of sedimentation continue, the dam will have no water approximately in 15-20 years (Eco-consult, 2000:4). This implies that the prevalence of environmental and energy crises in the study area.

Figure 4, Gully in the study area (2005)

b) Field observation:

Analysis of the field observation also clearly exhibit the extent to which the local land being under the process of degradation including the area changed to barren land, exposed rocks and devoid lands. Moreover, content analysis of the field observation shown that prevalence of gully development apart from farm plots, especially, in sub-areas which endowed by dark black volcanic soil. In addition, in the dry season wind erosion is a common phenomenon in the district. (See Figure 3, 4 and annex 8).

To sum up, based on the community perceptions and field observation analysis, in addition to the estimated rate of deforestation identified that the decline of land productivity year to year, and change of forestland to devoid and barren land and prevalence of soil erosion. Generally, the cumulative effect of all these may have bad implication for the quality of the local land resources and life of the communities.

4.3 Causes of deforestation

Land and Forest were some of the major means of livelihood, especially in the rural area of the district. However, there was a scarcity of these resources. As a result, the resources were under serious degradation as discussed in the above topics. Accordingly, respondents were asked about some of the major responsible factors for the shortage of land and forest resources and its adverse environmental impact.

Out of the total 169-sample population, a large portion of the respondents, 97% and 68% identified fast population growth and development projects caused access restriction to the local natural resources that led to over exploitation of the remaining resources. Moreover, about 35% of the respondents selected physical factors (see Table 9). In relation to this, the information obtained from the *Dodola* district RADO concerned personnel; IFMP Adviser and GTZ Representative, and Project Manager; leaders of the two PAs, development agents, elders and youths, identified as follows:

- Unbalanced land holding and dependency on land
- Increasing of population

- State farms induced access restriction to the local grazing and/or arable land and expansion.
- Incompatible conservation measures/ activities
- Urbanization and demand for the forest products
- Expansion of high-tech, etc.

Some aspects of the above factors will be discussed in detail under the coming sub-topics in relation to the deforestation.

Table 9, Survey responses about the major factors for the scarcity of natural resources that led to degradation

	Items	Response	Frequency	Valid %
1	Human population growth	Yes	162	97.59
		No	42	2.41
		Total	***166***	***100***
2	Development projects (e.g. state farms, etc)	Yes	115	68.45
		No	53	31.55
		Total	***168***	***100***
3	Natural process	Yes	59	35.33
		No	108	64.67
		Total	***167***	***100***

Source: Own Survey (2005)

4.3.1 Uneven distribution of land holding and dependency on land

Informants in both PAs have mentioned that historically the dominant farming system in the area was pastoralism, although later on mixed farming was practiced. However, nowadays crop production is predominantly practiced. Moreover, according to the data computed based on the responses of the survey, the average number of cattle ownership was not more than 2/3 per family.

Differences were observed within and between groups with regard to the size of land holding. The overall cropland holding was about 2.23 ha for 8.71 family sizes in the two PAs. The mean land holding size of MHHs was 2.32 ha with 1.32 standard deviation

and 0.25 ha minimum and 8.0 ha maximum. While, the mean land holding size for FHHs was 1.46 ha with 0.99 standard deviation, and 0.25 ha minimum and 4.0 ha maximum (see Table 10). This indicates the wide difference of access to the basic means of livelihood in the area, especially between MHHs and FHHs. Therefore, it can be inferred from the data that those who have held small land with large family size are likely to be involved in wood selling from the local forest to subsidize their income.

Table 10, Land holding of the sample respondents

Sex of the respondent		Crop land holding (in ha)
MHH	N	151
	Mean	2.32
	Std. deviation	1.32
	Median	2.00
	Sum	349.75
	Minimum	0.25
	Maximum	8.00
	Range	7.75
FHH	N	16
	Mean	1.46
	Std. deviation	0.99
	Median	1.20
	Sum	23.40
	Minimum	0.25
	Maximum	4.00
	Range	3.75
Total	N	167
	Mean	2.23
	Std. deviation	1.31
	Median	2.00
	Sum	373.18
	Minimum	0.25
	Maximum	8.00
	Range	7.75

Source: Own survey (2005)

Respondents were asked about their household involvement in firewood selling from the local forest in the past. As shown in Table 11, out of the total valid responses the majority of the MHHs i.e. about 79% and 87% of FHHs replied yes. The remaining 20% of MHHs and 12% FHHs respondents noted that their family did not involve in fire wood selling. This implies the high engagement of the local people in wood selling from the natural forest, particularly FHHs (see Figure 5).

Table 11, Survey response on their household's involvement in wood selling from the natural forest during lack of income

Response	Sex of the respondent		Total
	MHH	FHH	
Yes	120	14	134
	79.47%	87.5%	80.24%
No	31	2	33
	20.53%	12.5%	19.76%
Total	***151***	***16***	***167***
	100%	***100%***	***100%***

Source: Own survey (2005)

In addition the information gathered through unstructured interviews revealed that most of the unskilled youths and new families, school dropouts, returned solders and poor women did not have land. According to the informants in further discussions, those who have held small land and those who totally do not have land are often involved in cutting trees for sale i.e. firewood, etc and clearing the forest for cultivation as a survival strategy, while some others use the forest land for grazing.

Figure 5, Respondent poor women engaged in firewood selling around *keta-berenda* village (2005)

Moreover, the interviewees also noted that land distribution was not carried out in the study area after 1991, as a result those who got the chance to hold large land size that they have used, while, other remain with small land and most of the new families (after 1991) and others that indicated above, have not get access to the local land resources, and they tended to look into the immediate state forest. Furthermore, as per secondary data sources confirmed that around the study area landless tends to reach more than 40 percent.

4.3.2 Increasing of human population

As shown in Table 12, the data obtained from BESO (2004:7) indicates that the current number of population in *Dodola* district was estimated to be around 173, 177 for the year 2004/5, while the 1994 census shows that the population in the district was 126,495 (CSA, 1996:96). Similarly, the total population sizes of *Keta-Berenda* and *Berisa* PAs for 1994 were about 4704 and 4841, respectively (CSA, 1994:176). However, the data obtained from *Dodola* district RADO estimated about 8628 people in *Kuta-Berenda* and 6280 people in *Berisa*, the year for 2004. (see Table, 13)

Table 12 Data on trends of population increase in *Dodola* district

Population, CSA for 1994	Population estimate for 1999by OBPED	Population estimate for 2004/5 by BESO
126,495	147,016	173,177

Source: CSA, The 1994 Population and Housing Census (1996:96), OBPED (2001:26) and BESO (2004:7).

The population of the district, especially in the rural areas, directly depends on the local land and forest resources. For some, it was an additional source of livelihood through harvesting and selling of forest products (e.g. fuel wood, etc) from the local forest to generate supplementary income, particularly in the rainy period/ before harvest. In addition, those who did not have land or held small land sizes gradually became involved in clearing the forest land into crop and/or grazing areas as a coping mechanism, to resolve their seasonal income insecurity.

Table 13 Data on trends of population increase in the two peasant associations

Peasant associations	CSA census for 1994	*Dodola* RADO estimate for 2004*
Kuta – Berenda	4,704	8628
Berisa	4,841	6280

Source: CSA, The 1994 Population and Housing Census (1996:176),
And *Dodola* district RADO, 2004

*Information taken from *Dodola* RADO was by considering the possible limitations it may have especially, about the total population size of *Berisa* PA.

Moreover, the urban population of the district and some other adjacent areas satisfy their wood demands from the forest, which stretched to the *Dodola/Adaba* area. Through time the increasing demand for fuel wood, charcoal, lumber and other forest products, from urban areas was also identified by the respondents as other dimension population pressure for the depletion of the local forest resources.

In addition, as indicated in the IFMP document, in the district the consumption rate of wood (for fuel and construction) was approximately $2m^3$/year/household while, the maximum annual increment of the forest was about $1m^3$/ha/year (which mean that from 35,000 ha of total forest land X $1m^3$/ha/year = $35,000m^3$/year that the maximum capacity the forest can provide for more than 40,000 households, in the district while, 40,000 households x $2m^3$/year/family wood demand = more than $80,000m^3$/year wood required totally. Thus, there was a wide gap between the maximum capacity that the forest can supply and the demand.

4.3.3 Expansion of state farms

As indicated in the literature part, natural resource scarcities may be induced and escalated by the increase of human and/or animal population, large scale development projects caused access restriction especially in the Lowlands, where private investment expanded, and resource degradation that reduce the resource productivity.

In relation to this, the information obtained from *Hererro* State Farm Manager and documents of the office revealed that currently, around 10,000 ha land area was under

the State Farms in and near the study area. (See annex 6) However, the land area under State Farms was changing over time. For example, *Hererro* State Farm which is located near to *Berisa* and *Keta-Berenda* villages, before the revolution was owned by the local landlords with about 80 ha total area while after it was nationalized by the military government and expanded to 440 ha up to the year 1969 E.C. then it reach up to 4743 ha by the year 1971 E.C. (formally launched) and 6127 ha by the year 1977 E.C. While, decreased to 3,662 ha during the current government period (see Table 4: 12).

Table 14, Evolution of *Hererro* state farm expansion

Years	Area (in ha)	Owner
1962-1966 E.C (Pre-Revolution)	80	Landlords
1967-1969 E.C (Post-Revolution)	440	Government
1970/1971E.C (Post-Revolution)	4743	Government
1972-1977E.C(Post-Revolution)	6127	Government
1997 E.C (Post- Derg)	3,662	Government

Source: *Hererro* state farm (2005)

According to the informants, the expansion of the state farm over time in the past caused, displacement of peasants and restriction of access to the local grazing and croplands. As a result, people were forced to re-locate towards the upper part of the area, which is marginal land/hillside, in and near to the natural forest. According to the informants, this was one of the factors that aggravated the scarcity of land and led to population pressure over the remaining land and forest resources, in addition to, the fast population growth in the study area. Moreover, they mentioned that the local farmers often have been complaining about the land they lost that tends to generate disputes over the land resources between the local people and the state farm.

Table 15, Survey response about the existence of dispute over land resources between the communities and state farms

Response	Sex of the respondent		Total
	MHH	FHH	
Yes	142	14	156
	93.42%	87.50%	92.86%
No	10	2	12
	6.58%	12.50%	7.14%
Total	***152***	***16***	***168***
	100%	***100%***	***100%***

Source: Owen survey (2005)

In relation to this, *Hererro* State Farm Manager said that the current government in order to resolve the local farmers' complaints and the dispute around 2,500 ha land were reduced from *Hererro* State Farm and given to the farmers who live in *Berisa* and other PAs. That is why, the total land area of this station decreased from 6127 ha to 3,662 ha. Moreover, as shown in Table 15, out of the total 168 valid responses about 93% expressed the view that there is a prevalence of disputes between the communities and the State Farms over grazing and/or cropland.

4.3.4 Inappropriate, conservation measures

I) Forest conservation

Forest and land resources were the two major means of livelihood in the area. So that, utilization of these renewable natural resources, has to be on sustainable basis in order to serve the current and the future demands. To achieve this, requires compatible tenure system, active participation of the communities and all other stakeholders, and proper planning.

On the basis of information that obtained from different respondents customary practices of rights to use forest products had been communal. That is, the right to use the forest collectively or by groups in line with the order and rules (*serra*) of elders and religious leaders of the social groups/clans and technical environmental knowledge, which have been transferred through imitation, initiation, apprenticeship and critical

observation of the real and spiritual words. Producing only at a level of the family demands or did not produce beyond the consumption needs of the family. In other words, not to harvest beyond the maximum capacity that the recourse can provide based on the experience obtained through long term direct, intimate and healthy forest and other natural resources utilization. Moreover, in the gabber system also people have granted rights (usufruct) to get access for the local forest and land resources.

The information obtained through in-depth interview with elders revealed that in the study area the *gabbar* system had been changed to the private property right system towards the end of the imperial government, until it was again changed to state property regime by the military government and followed by the EPRDF with minor modifications e.g. Forest Proclamation of Oromiya (Proclamation No. 72/2003) allowed for private forests and community forests in addition to the state forest ownership type. Regarding this, the regional (Oromia) Rural Land Use and Administration Office (2002:33) noted that forest/land was the common property of the people. Forest/land was used and owned communally before the region under the ruling of Emperor *Menelik*. Later on, forest/land was became private property before the revolution. While, during the military regime land treated as the state property and more or less similarly by the existing government (EPRDF).

The elders by their discussion argued that the local natural resources had been protected, conserved and utilized in better conditions, (because of secured use rights) in the customary and private tenure systems. Moreover, they expressed views in favour of the customary tenure systems because they had not been excluded from the use of the local forest resources.

According to the informants landlords had no interest to sell the forest rather they preferred to transfer for the feature generations; as a result, often they refused when they were asked to sell the forestland. In relation to this, in the IFMP report stated as follows:

Prior to the 1975 Land Reform Proclamation the Dodola forest ... was owned by few landlords. During this time the forest was well protected by the owners and no one was allowed to extract trees without permission. After the government nationalized the forest, the forest was widely opened for several timber concessionaires. Some individuals who came to the area along with this people have started practicing pit-sawing ... Through time... more and more people have been attracted and became member of the "club" of the so called "illegal forest users"... After the fall of Derg in 1991, the forest was left totally uncontrolled and the number of people extracting forest products has increased. Many people including the ex-service men have encroached in the forest ... To day the problem has even got worse. A lot of people are campaigning on it....

Like wise the situation of the forest altered in line with the changes of the tenure systems. Moreover, during the military government the responsible body for the protection of natural resources, was only the state, through inappropriate institutional measures and insufficient conservation activities, such as wood confiscation by government bodies, poorly designed afforestation programmers, construction of soil conservation structures through forceful campaign etc.

In the 1990's also the natural resources conservation measures seems the continuation of the past government's way of resources conservation. According to the interviewees the conditions of the resources were worse than in the *Derg* era.

The district forest experts in their turn noted the situation by saying that large-scale deforestation of the *Dodola* forest took place mainly during the down fall of the *Derg* regime and the condition has continued to the present. Many individuals cut and sold firewood, charcoal, construction wood and sawing timber to neighboring towns mainly *Dodola, Adaba, Hererro, Edo, Assasa* and surrounding areas of *Aisi* zone markets, even to *Assla, Nazereth*, etc. As a result, indigenous tree species such as Hagenia abyssinca (*Kosso*), Podocarpus gracilior (*Zigba*) Juniperus procera (*Ted*), Olea africana (*Weira*) and others have been threatened.

Figure 6 Deforested Hill Namely *Tullu Lole* at *Berisa* village (2005)

However, as the information from the district Natural Resources Protection and Development and Rural Energy Expansion section head, forest expert, and the IFMP Project Office Team Leader and Project Manager revealed that the government in order to tackle the fast destruction of the natural high forest with the assistance of the Government of the Federal Republic of Germany established the *Adaba - Dodola* Integrated Forest Management Project (IFMP) in 1995 (the total period was 12 years/1995-2006) based on the 1988 Ethiopian government request for the assistance.

The project attempted to apply different ways in order to save the forest in the study area such as recruiting forest guards; village development activities (e.g. rural roads), awareness creation and trainings, establishing protection committees at village, district, zone and regional levels; and fencing of area closures, between the year 1995 and 2000. However, all of the above activities of resource conservation ended up without significant positive impacts and without creating a sense of ownership.

Later on, Forest Dwellers' Association (FDA) approach was introduced in June 2000 that covered around 7,000 ha in three PAs including *Berisa* (one of the study sites). Nearly, 360 ha forestland in order to be managed by a group of 30 families (12 ha for each) and total of 17 FDA groups were established in the three PAs that consist 467 total households (homesteads) out of which 157 households found in *Berisa* PA. The FDA approach provides exclusive user- rights to the users' groups based on the five years contractual agreement with the government. The major exclusive user-rights were to inhabit in the forest (those who live in and near to the forest before two years), use of forest and receiving legal recognition including duties and obligations to maintain/develop forest condition, pay rent that range between 2 and 8 birr per hectare per year, and to restrict forest use by non-members in order to reduce pressure (IFMP/GTZ, 2005).

As indicated in the progress report of the project the condition of the forest, which was managed by forest user-groups considerably improved (the tree cover assessment has shown an increase in the cover by 5 percent in the year 2004), increased quality of natural regeneration; and significantly reduced the illegal tree harvest and overgrazing; and generating income for the FDA members. Moreover, the project provided supports for a number of private/group made nurseries of seedling and tree planting (IFMP Report, 2000, and Report of 2005).

On the other hand, the information obtained from the majority of the losers', and DA's, Teachers', the district Land Use and Administration expert and elders' both from the study PAs and neighboring villages pointed out some of the positive results and undesirable effects of the project which can be summarized as follows:

Positive impacts of IFMP: Establishment of FDA created a hope for the forest protection from destruction and common vision among different stakeholders; the forestland that is held by users' groups was not in open access for free riders; 500-600 lumbering saws were destroyed by chemical; etc.

Undesirable effects of the IFMP/ conservation approaches: Some of the major undesirable effects of the project were also summarized as follows:

- The project allowance payment for the farmers was criticized as they were seen to be bribed to protect their own local forest;
- Conservation through exclusive use rights that are only for the small members of the communities resulted in the discrimination of the large majority members of the communities and aggravated inequality. For example, in *Berisa* PA (one of the study village) out of the total 820 households in the village only 19% were organized as members of FDA while, the remaining 81% families were marginalized from the use of the local forest resources except the area highly deforested and were not incorporated under the conservation blocks.

  Moreover, non-members' of the FDA in *Berisa* PA held crop land on average 2.60 ha by MHHs and 1.88 ha by FHHs, while in the same village FDA members held crop land on average 3.17 ha and 2.33 ha by MHHs and FHHs respectively, in addition to 12 ha forest land holding by each member of the FDA (see Table 16).

- According to the informants, the newly introduced conservation approach not only marginalized the large majority of member of the village but also became a source of conflict over resources and created competition over forest resources, before the remaining forest being under the FDA approach in other PAs as *Keta-Berenda*. Even those FDA members are also involved in the destruction of the forest, which was exposed for competition at distance location from their village. According to the interviewees the slow process/nature of the approach itself has contributed for the vulnerability of the forest, which was not included in the approach, for competition.

Table 16, Household head distribution by FDA and non-FDA membership in *Berisa* village

Type of the HHs	**Non-FDA member HHs		*FDA member HHs		Total HHs	
	No.	%	No.	%	No.	%
MHH	625	94.27	130	82.80	755	92.07
FHH	38	5.73	27	17.20	65	7.93
Sub-total	663	100	157	100	820	100
Total	663	80.85	157	19.15	820	100

Source: *Dodola* district RADO (2005) *FDA = Forest dwellers' association

**Non-FDA = Non – forest dwellers' association

Some others complain by saying that in the past the forest was used by all members of the communities, while, now they provide an opportunity only for a few member of community, to those who were re-created as landlords. This implies the prevalence of dissatisfaction and misunderstanding of the complaints'/losers'. As a result, disputes often occurred in different areas, e.g. in *Deneba* PA at *Kangity* block on 22/6/1996 E.C, there was a mob of the losers by which some of them imprisoned for a few days by the order of the PA administration; and in *Bura-Adele* PA between 2000 to 2004 the losers appealed to the district RADO, IFMP office, and to the district, zonal and regional levels of administration, in order to get access to the local forest resources.

- For many years the IFMP did not get acceptance in the adjacent district (*Adaba*).

- Forest inventory, the necessary instruments (e.g. GPS), area demarcation and other processes were costly to replicate and difficult to be managed by the district RADO the FDA approach in other PAs.

- Those individuals who entered into the forest for lumber production have been included in the users group.

- Risks might arise from the fact that only a minority of farmers received the privilege of user-rights as social fencing and this created suspicion about the sustainability of the approach even in the minds of the winners.

Case studies about disputes over forest resources

Box-1, Case study A

Ato Germa Kabeto from Berisa village and a member of a FDA noted that in 1993 E.C a dispute occurred between himself and *Ato Hassen Bedaso* who live in the adjacent PA namely *Bura-Adele* village over forest resource, when the cattle of *Hassen* entered into *Sulula* forest block in which *Girma's* household was a member of the users' group.According to *Girma*, in 1994 E.C the dispute led to the fighting between the two families as a result, of which three people were wounded and the cattle was also killed. Then, the dispute which was between the two households gradually changed to the conflict between *Shedema* clan, in the side of *Girma* and *Semena* clan, in the side of *Hassan*, However, after a long court process, elders namely, *Kabeto Semu, Suletan Hebo, Daru Kabeto* and others resolved the issue according the local culture after three years in 1996 E.C., by which *Germa* was penalized, i.e. he paid all the medical treatment costs, and provide a bull that was slaughtered for the resolution ceremony.

Box 2, Case study B

Elder *Sultan Kalu* from *Berisa* village noted that he was a mediator to resolve the disagreement that occurred between two brothers over forest resources in 1996 E.C. The elder by his detailed discussion revealed that the two families had entered into contradiction when *Benta Kabeto's* family (non-FDA number) prohibited to collect firewood by *Amano Kabeto* (FDA member), in turn *Benta Kabeto's* family did not participate in the funeral ceremony of his brother (*Amano's* child), by way of reprisal. After a year, in 1997 E.C. elders attempted to resolve the issue. That is, they decided that *Amano* should ask excuses and for the future the two families should cooperate and help each other.

Respondents were also asked about their perception in relation to disputes over natural resources in area. Accordingly, out of the total 165 valid responses 86% of the

respondents recognized that prevalence of disputes between FDA and Non-FDA members' in the area, over forest resources while 14% replied no (see Table 17).

Table 17. Household response about the existence of dispute over forest resources, between FDA and non-FDA members' in the area

Response	Sex of the respondent		Total
	MHH	FHH	
Yes	126	16	142
	84.56%	100%	86.06%
No	23	-	23
	15.44%	-	13.94%
Total	***149***	***16***	***165***
	100%	***100%***	***100%***

Source: Owen survey (2005) * 4 Respondents were not included

The IFMP office also in its document stated that after the establishment of FDA the following types of conflict occurred over forest in the area:

- Conflict between FDA groups and non-FDA groups
- Conflict within FDA groups,
- Conflict between different FDA groups over forest block border,
- Conflict between FDA leaders and government institutions (police, court, district administration, village administration),
- Conflict between FDA groups and forest administration, etc (*Abdurahiman*, 2002:3-5).

II) Poor farm practices /soil conservation activities

Poor farm practices and land management an activity in the study area is also a commonly observed situation. Interviewees have indicated that due to land scarcity peasant families are reducing indigenous sound practices such as seasonal movement of herds and fallowing. As a result, they have been forced to use the land that they have already held under environmentally irrational levels of grazing and continuous cultivation of only few crops such as wheat, barley, *teff* and the like, and reducing the cultivation of legume plants.

Moreover, because of depletion of the forest over time, some families give priority of firewood for sale rather than to use for their own household consumption, as a result

they tend to used animal dung, and *Adami / Kulqual* or Euphorbia abysinica) and crop residues/stalk; but also in order to resolve their income insecurity, they prefer to sell crop residues of flax and *teff*, which are highly in demand in the local urban areas for local mattress preparation and house construction as well as farmers families used remnants of their harvest as sources of fodder.

Hence, such coping mechanisms of farmer families, have bad implication for their farmlands to maintain and improve the soil fertility under a given small amount chemical fertilizer, nearly 20kg per family (OBPED, 2000:59) utilization on the average 2.23 ha of cropland per family. Furthermore, the district agricultural experts noted that there was also burning of crop residues practice by some peasant families, who held large land size.

Table 18, Rank order of fuel wood used

No	Response	Sex of the respondent		Total
		MHH	FHH	
1	Fuel wood	110	13	123
		73.33%	81.25%	73.65%
2	Leaves	1	-	1
		0.66%		0.60%
3	Crop-residues/stalk	7	-	7
		4.64%		4.19%
4	Animal Dung	33	3	36
		21.85%	18.75%	21.56%
Total		***151***	***16***	***167***
		100%	***100%***	***100%***

Source: Owen survey (2005) * 2 Respondents were not included

Respondents were asked to indicate the primary and secondary sources of fuel in their family. As shown in Table 18, out of the total 167 valid responses, the primary energy source was firewood from the natural forest for around 74% households, followed by animal dung 22%, crop-residues 4% and leaves 0.6% respectively.

While, out of the total 148 valid responses as secondary fuel source, about 52% of the households used animal dung, followed by firewood 23%, leaves 17%, crop residues 6%, etc (see Table 19). This implies that a considerable proportion of households used animal dung both as primary and secondary sources of fuel, rather than being used to

maintain and improve soil fertility of their cropland, which they cultivate continuously with very small amounts of factory fertilizer.

Table 19, Rank order of other fuel sources

No	Response	Sex of the respondent		Total
		MHH	FHH	
1	Fuel wood	36	1	37
		24.32%	7.14%	22.84%
2	Leaves	24	4	28
		16.23%	28.57%	17.28%
3	Crop-residues/stalk	10	-	10
		6.76%		6.17%
4	Animal dung	77	8	85
		52.03%	57.14%	52.47%
5	*Adami* or Euphorbia abysinica	-	1	1
		-	7.14%	0.62%
6	Kerosene	1	-	1
		0.68%	-	0.62%
Total		***148***	***14***	***162***
		100%	***100%***	***100%***

Source: Owen survey (2005)

As indicated in the item1 of table 20, in assessing the tendency of building structure practice (using 5 level scales) respondents have rated the lowest level building structures of to reduce or control of soil erosion on cultivated land. The overall average level of building structures of the households was computed to be 1.84 with a 95 percent confidence interval of 1.67 – 2.01. As this mean value and its confidence interval lies completely below 3 (ideal mean), it can be concluded that there was low application of terracing, at least to reduce soil erosion from the plots of the households. Moreover, in item 2 of table 20, in assessing the tendency of cut –off drainages practice of the respondent households, the total average level was computed to be 3.63 with a 95 percent confidence interval of 3.42 – 3.83. As this mean value and its confidence interval lies totally above 3 (ideal mean), it can be inferred that respondent households practiced cut-off drainages at moderate level.

Furthermore, tree planting (item 3) conservation technique application of the respondents mean was computed to be 1.10 with a 95 percent confidence interval of 1.03 – 1.17. As this mean value and its confidence interval completely lies below 3, it

can be concluded that there was very low tree planting or agro-forestry, which help to conserve soils and supply firewood, etc or reduce population pressure from the natural forest.

Informants assessed, soil conservation efforts/activities as it being, weak and insignificant. While, soil and water conservation experts of *Dodola* district RADO noted that in many areas soil structures, drainage furrows constructed by the communities' efforts were destroyed by the Lorries of illegal wood traders, tractors and combine harvesters.

Table 20, Survey response about conservation activities that the households practiced

No	Item	Statistic	Total
1	Building structure /terracing	N	156
		Mean	1.84
		Confidence interval	167-2.01
2	Cut-off drainage	N	155
		Mean	3.63
		Confidence interval	3.42-3.83
3	Tree planting	N	154
		Mean	1.10
		Confidence interval	103-1.17

Source: Owen survey (2005) *12-14 households did not perform any of the above conservation activities.

III) Government policy information gaps

Diverse agro-ecological zones, characterize the region endowment as natural forests, out of 58 national forest priority areas 38 of these where found, source of biodiversity and so forth. Moreover, out of which four of the RFPAs (Regional Forest Priority Areas), are located in Bale Zone, where the study area found. However, because of environmentally unhealthy human intervention or misuse and lack of good policies, legal and institutional environments and other factors, natural resources bases, of the region especially, the forest resources shrink rapidly than ever before.

In relation to this, the Environmental Protection Office of Oromia Region (2003:1-2) noted that the region was endowed with environmental resources like biological (e.g. different species of plants, animals and micro-organisms) and non-biological diversities.

However, these resources have been exposed to several factors. As a result, the ever-increasing loss of the region's forest resources, soil degradation and loss of soil fertility, poor health and sanitation, poor water treatment and disposal systems were identified as the main environmental problems of the region.

After the 1994 decentralization in order to mitigate the main environmental problems the regional government has provided the following environmental policy, legal and institutional frameworks as attempted to summarize some of the major aspects as follows.

The regional government issued, "a proclamation to establish the Oromia national resources development and environmental protection authority based on the objectives such as: to assure the proper conservation of the natural resources; to ensure the judicious land administration through formulation of land use policy; and to assure that all economic development shall be implemented based on the regulation of environmental protection and laws of ecological balance (Proclamation No. 43/2001:1-3). Accordingly, the regional state provided regulation for the establishment of Oromia environmental protection office with formal authority and duties (Regulations NO. 28/2002:1-4),

Moreover, the regional government also has been issued, rural land use and administration proclamation consist of important articles as: that ensure, "any residents of the region aged 18 year and above, who livelihood depends on agriculture and wants to live on some have the right to get rural land..." and "The customary right of access to land in using communally like for grazing, ritual ceremonies ... shall be maintained both for peasants and pastoralists". In addition, it assured that peasants' lifelong right to use the land that already held, lease, etc. In relation to forest and land resource utilization and management stated that "pockets of natural forestland shall be identified, demarcated, protected, managed and sustainably used, land users are obliged to manage and protect, mother trees found on their holding, it is prohibited to plant tree species like eucalyptus and euphorbia on farmland and around water sources and also,

obliged to avoid from his farm plots hazardous weeds, any land user ... shall be obliged to preserve and maintain conservation structures" etc (Proclamation 56/2002:1-10).

Furthermore, the regional state also provided forest proclamation. According to this forest proclamation there were three types of forest ownership i.e.

(i) State forest - that are identified as regional forest priority areas (RFPA) and which can be around 38 RFPA in number,
(ii) Private forest – owned by individual peasants, governmental organizations (e.g. schools), non-governmental and religious organizations (e.g. churches) around their homesteads/backyard, wood lots trees, on farm plots, and on land that not suitable for agriculture, and
(iii) Community forests – patches of forests outside the boundary of state forest controlled by PAs.

As the above proclamation forest utilization in the region, "the traditional user right of the local people to use the state forest resources such as fuel wood, construction wood, medicinal plants, grazing etc shall be permitted according to the regulation and directives", eco-tourism activities shall be established as well as it is forbidden: to clear the forest for the agricultural activities; to cut trees and utilize tree products in the protected forest and cutting indigenous tree species, such as, Hagenia, Cordia, Podocarpus, Prunus and Juniperus would be a crime, which may resulted punishment by law to the extent 5-15 years to be a prisoner (Proclamation No. 72/2003: 3-10).

Given the natural resources exposed to different man induced unregulated exploitation of environmental resources (forest and land) beyond the carrying capacity since long period of time, and to the complexity and magnitude of environmental issues in the region I think, the establishment of environmental protection office with formal authority and duties and regulations, including its three years strategic plan, rural land use and administration proclamations, and forest proclamation provision can be an opportunities for the resources conservation in the study area.

On the other hand, majority of the respondents, 70 percent of the survey respondent household heads noted that they are not well informed about the above policy, laws and regulations that revolving around the utilization and conservation of natural resources. While, considerable numbers of the household respondents, 30 percent were not in favor of the laws being appropriate to the local circumstances and use practices.

This have been evidenced by high involvement of the people in cutting prohibited indigenous species trees, which discussed above, building soil conservation in the study area was less encouraging, planting different species which were prohibited like Eucalyptus and Euphorbia were found extensively and haphazardly without proper land use planning and land tenures. Moreover, dangerous and new type of weeds such as *Agimpna* (which grown, flourish and spread its spores easily through winds during winter season, and vigorously deplete the fertility of the soil with its very deep roots, new species of *Swedenia* (*Mujja*) and *Bromes* (*Sinar*), etc widely observed that adversely affecting agricultural productivity in particular and the local environment in general or they were not able to avoid as declared in the regional rural land use and administration proclamation.

In addition to illustrate the above discussion more specifically, the extent of tree planting privately by survey respondents account Eucalyptus 36.36 percent, Euphorbia candelabrum 59.85 percent, indigenous tree species as Junipers was about 1.52 percent, and decoration /non-indigenous tree species as Cupressus was also about 2.27 percent. So that, nearly 96 percent of the tree types that dominate were Euphorbia and Eucalyptus as oppose to the desired achievements by environmental concern, in the regional land and forest conservation and utilization documents.

According to this proclamation article 14 (2003: 10-11), states "It is prohibited to cut and utilize protected tree species, such as, Hagenia abyssinica, Cordia africana, Prodocarpus falcatus, Prunus africana, Juniperus procera". Moreover, as stated in article 15 "who committed to act of performing activities mentioned in article 13 and 14, ---, shall be penalized with 5 to 15 years of imprisonment. However, the information

from the expert of the *Dodola* district RADO has revealed that in the year 1995 E.C. out of the 67 illegal tree (prohibited tree species to cut) harvesters only 15 of them appeared in court and no one of them was penalized. According to the expert the above proclamation was not implemented because of low concern and support of legal bodies. Moreover, market failer to provide effective demand for the agricultural products especially in the year with better climatic condition, and increasing of taxes and price of fertilizer also identified as the causes that encourage deforestation.

Furthermore, by critics of the respondents some of the forest conservation measures complained, being heavily in favor of protection, preservation and restoration of the forest while, less emphasis about the socio-economic, cultural and political aspects of the local communities who had been living with the resources in harmony and interdependently for many centuries. As a result, the desired positive impacts not encouraging.

4.3.5 Urbanization and demands for forest products

Fast expansion of urban areas or urbanization aggravated the scale of demand for firewood, charcoal and materials (wood) for construction and timber. Regarding the above discussion, the information obtained from the district RADO (Rural and Agricultural Development Office) and the 1994 census report described that in the major town and including more than four small towns namely *Hererra, Edo, Serofta* and *Negele Metema*, the number of urban inhabitants between the year 1994 and 2004/5 shown an increase from 26,913 to 49,057 people respectively.

While, as indicated in the literature the urban dwellers, who preferred charcoal rather than firewood and those who migrate from the rural to urban areas tends to consume twice of the energy than what he/she was in the rural area, implies the increasing of forest demand/pressure (Sallen, *et al.* 1994:149).

Moreover, the expansion of wood workshops and wood markets also other cause that exacerbating over utilization the forest According to one of the expert informant, at

which would be taken from the encroachers. However, as the above informant, often they used raw materials/woods harvested illegally form the indigenous trees such as: Hagenia (in most cases), Olea, Juniperes and Podocarpus trees, which is based on the market demand furniture's and other products of the workshops made from (raw material/wood origin).

Figure 7, Wood market at *Dodola* town (2005)

Lack of fuel saving technologies: In addition to the above factors, lack of alternative technologies, were also exacerbate the challenge. According to the Natural Resources Protection, Development and Rural Energy Expansion Team Leader, there is only one female personnel in the district to provide training, awareness raising and introducing fuel saving alternative technologies. As the respondent the effort is at infant stage in the district. While the access for HEP (Hydro-Electric Power) in the district, including the major town of the district only two/three urban areas have got the access for HEP supply at all. But also, those who have got the access of HEP supply because

stage in the district. While the access for HEP (Hydro-Electric Power) in the district, including the major town of the district only two/three urban areas have got the access for HEP supply at all. But also, those who have got the access of HEP supply because of the high cost of HEP people tends to use often for lighting and other similar low cost purposes only. In general, people in the study area highly dependent on the traditional fuel sources such as firewood and charcoal.

4.3.6 Application of agricultural high-tech

Farm mechanization may have vital roles modernizing agriculture especially, where better industrial development or healthy economic transformation achieved, to substitute the rural labor force. While, it has also environmental, and social negative impacts such as accelerate clearing of vegetation cover when it is compared with oxen tillage and accentuate soil compaction.

The findings of the household survey revealed that most of the families engaged in purchasing combine harvester and majority of them also depend on tractor services provision both by public and private investment. Out of the total 169 respondents, about 90 percent confirm using of combine harvester service, 56 percent, 19 percent and about 11 percent using tractor services, hire rural labor and yield transportation services of tractor, respectively.

From the prevalent farm mechanization in the study area beyond its important role in modernizing the local farming system, it also has adverse environmental, economic and socio-cultural impacts. In relation to this, the past (1970's) experience of Egypt's shown that, state initiated investment on modern labor saving technology, as tractor, combine harvester, etc in the country where the industrial sector is at the infant stage or not able to absorb the rural labor force, devoting the scarce budgetary resources can led to bring private benefit into conflict with social benefit through encouraging the use of more traded modern inputs as petroleum and machinery at the expense of domestic inputs like the rural labor and animal draft. According to the writer, accelerated farm

mechanization in the country like USA based on farm land supply elastic approach which increasing the amount of land farmed per workers productivity rather, by supplying more input per unit area can be more responsive than the former one for Egypt (Cuddihy, 1983: 232-234).

Thus, accelerated farm mechanization in the country like Ethiopia were 85 percent of the population in the rural area, and all most (directly and indirectly) all, of the rural people involved in subsistence farming may exert social costs as: the effect of subsides, tariff exemption or reduction, rising in foreign exchange cost of inputs as oil fuel, tractors, harvesters and other spare parts (traded) at the expense of the domestic inputs (replace unskilled labor, animal draft, organic manner and other indigenous technologies (non traded inputs), in light of the above facts including the pollution impacts, due to extensive use of fossil fuel and complete clearance of vegetation.

Similarly, this phenomenon starting from the eve of revolution of Ethiopia to now is going on the study area. While, more carried out in the current government by the: public enterprise and private sector aggressive involvement in providing farm mechanization services to the small land holders, is going on in the study area like that of Egypt before several decades. Besides to the grass or vegetation cover devastating effect of tractors when it is compared to the traditional farming practices at small scale; further substituting the landless or snatch the livelihood of the unskilled rural labor forces, those who were manually harvesting for food or small wage payment, crop sharing and so forth. In other words, it is encouraging unemployment. Moreover, soil and water conservation expert claimed these technologies for the carelessly distracting soil structures, trash lines, check dams and drainage cut-off in the study area.

Some of the farmers – informants claiming that the prevalent of disagreements occasionally between the local farmers and farm-mechanization enterprises, both at household and community levels with regard to the increasing of cost of harvesting, (e.g. from *birr* eight to *birr* twelve) overtime and change of basis of pricing, e.g. rather than per quintal they may ask to pay the price of normal years average product per hectare in the year with low out put per hectare, wasting yields during harvesting

process, competition to get the service when erratic/unexpected weather condition is occurred around the time of harvesting and preference of the enterprises relatively better yielded fields and sub-areas may not affected with the irregular weather condition as compared to one another.

According to the respondents, those who discriminated from the service may face loss of the yield partly, including the loss of the quality of the product, as a result, in many cases those who have access to the natural forest encouraged to cut trees to sell firewood, charcoal, etc as coping mechanism or to complement their food needs.

Moreover, in the interviews most of the respondents described due to its impact and some other factors, they have perceived the decline of *Wonfel* (labour sharing), *Jiggi* (voluntary cooperation), crop sharing, and wage labor, and favor to cultivate wheat based on the cost of farm mechanization services, market price and out put per hectare. This may imply the dependency of the local people over technology and also indicate the depletion of important indigenous institutions and tendency to narrow/ mono cropping, which is environmentally irrational farm practice to maintain the local soil fertility.

4.3.7 Conflicts on the use of land resources

In the highlands of Ethiopia conflict occurred mainly due to resource scarcity which occurred because of the increasing demand of natural resources, population pressure, and expansion of bad lands as the result of land degradation, (Ludi, 2002:19). Likewise, around and in the district competition over scarce renewable natural resources, was a common phenomenon, in relation to the issues as:

A) Land uses:

On the basis of information obtained from the Oromia Environmental Protection Officer, in the region the total grazing land needed is about 35, million hectare of land, while, the existing available grazing land is only 4.3 million hectare. Hence, from the total

required, the available resource is only about 12 percent. In other words, overgrazing is seriously affecting the rangeland and forest ecosystems of the region currently.

The present major land use types of the *Dodola wereda* may be categorized in detail into: peasant cultivated land (22.87%) state farm (5.24%), forestland and wood land /shrubs (54.90%), grazing land (14%), settlement and others (3%). On the other hand, the number of rural families found in the district approximately estimated to be range between 54 to 60 thousands. While, the number of livestock that found in the district: cattle (266.619), sheep (42,336), goat (10,273) and equines (38,648) and so on.

Table: - 21 Land use /cover in *Dodola* district

Annual crops		Perennial crops		State farms		Grazing land		Forest Land		Settlement		Others		Total
Area (ha)	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	
30,978	21.63	1,781	1.24	7503	5.24	20,054	14	78,644	54.90	3,216	2.25	1,070	0.75	143,246

Source: *Dodola* district RADO (2004) and *Hererro* State Farm (2004)

That is, in district the average grazing land per family was around 0.3 hectare and livestock ownership per household was 5.3 and arable land per family was around 0.5 hectare. As stated in chapter three nearly 90 percent of the population in the lower altitudes. Therefore, given traditional farming systems the average grazing land and cropland were too small while the land under state farms and other land uses seems irrational. (See Table 21) This may specifically indicate that the observed pasture unbalance and other conflicting practice in the existing land uses.

B) External interventions

External interventions that attributed to the conflict between individuals, and groups and individuals, and between group actors attempted to summarize as follow:

i) Afforestation scheme;- The information obtained from the forest administration emphasized that ambitious afforestation program and soil conservation structures

building measure were the two principal activities during the *Derg* era. As a result, peasants have lost their access to the local river in trees, browse and fishing. Moreover, the peasant families were not allowed to collect the products of trees from the afferstation area.

Thus from the current poor status of the forest plantation and massive destruction of community forests, during the military government downfall and that followed by transitional time, one can inferred that in addition to the lack of proper study and planning of the scheme, but also lack of active/popular participation of the communities and lack of a sense of ownership. This may also indicate the potential consequences of farmer's complaints that led to the extensive deforestation at a time when the government power became weak and during political instability.

Respondents reported that forest closure during the current government era, criticized because of over emphasizing for the protection and restoration of the forest was, also as sources of dissatisfaction and lack of a sense of ownership. As a result, in many cases farmers shown resistance and engaged in disputes with the guards, forest administration and project personnel. This may also an indication of the consequence of being the local people denied to their customary means of existence, and not to take lessons for the *Derg* conservation activities environmentally and social undesirable effects.

In the study area there is a high potential of risk for the large scale of conflict over natural resource than ever before. Regarding this, adviser of the project described the risk potential as follows:

> *The forest which was around Lajo area already cleared. Moreover, most of the peasant farmers who had been displaced because of the government farms and dam construction were not included in the forest dwellers association. There were also using the limited remnants shrubs, which were out of the area of demarcation of the forestland area, this also by now on the way of to be finished. Then after as to me, it is seems inevitable being they will engaged into*

fighting with those who held the users right, unless some solutions searched...

ii) Private investment:-Another category of disagreement can be linked to private investment in logging/ timber production, illegal wood traders and wood workshop enterprises and illegal forest encroachers' versus the forest administration workers. An example for this case, *Kassahun*, Forest Development and Protection Expert describes the condition in the following terms "an illegal wood trader some times tends to give me warning to stop my follow up unless they take the action that may to create danger on my life."

iii) Exclusive use rights - This already discussed in detail in other part of this chapter, under undesirable effects of the IFMP (Integrated Forest Management Project).

iv) Government farms: The finding of the household survey asserted that contestant is protests against the state farms include using grass found at edge, between different farm blocks (before the crops harvested) and using crop remnants, which was prohibited, and clearing shrubs and tress farm the immediately found hillsides, namely *Tullu Dodola*, which is not used by the government farm due to the slope that not suitable form farm mechanization (e.g. Combine harvester) for cultivation as coping strategy. As stated earlier in other sub-topic of this chapter public and private farm mechanization enterprises also were source of disputes in the study area.

v) Dam construction: According to the respondents farmers who live in and around *Keta, Wabe Burketu, Baka, Ejeressa, Harro-Hunte, Allolla, Shellenda, Kansho-Miscra* and other PAs have lost their access to land and the belts vegetations which was used for grazing during the summer time, (when the fields covered by crops,) i.e. when *Melka Wakana* hydro electric power man-made lake created and expansion of the water in the reservoir, during the rainy season to the upper catchments and flood hazard to the down the stream. While, *Melka Wakana* project environmental impact report also witness that more than 11,000 rural people and around 9,000 ha of land

areas would be affected when the dam was created, in four villages alone. In addition, there is a claim over cultivation and grazing lands, which exist as reserved excessive area and fenced by the *Melka Wakana* hydroelectric dam. As the informants, wide land area that is closed by the station, become a source of disputes between the station administration and peasant farmers, who lost without any compensation when the reservoir formed. While, in order to resolve the demand partly the farmers allowed to cut and carry the grass from the closed area to use as fodder for their cattle's, they have allowed to take money that paid by the cattle owner for the grazing of a cattle that non-member of these villages, and one of the village, as compensation get access of HEP supply recently.

vi) Landlessness: The community leaders reported that the proportion of landless peoples such as ex-service men/solders, new households, matured unmarried youths, youngsters etc was estimated to be more than one third of the total families of the villages. Moreover, the information obtained from the secondary data source indicates that the percentage of the landless around the study area ranged between 40 percent and 50 percent. On the other had, the information secured from a number of informants confirmed that often landless youths engaged in nagging with their parents due to their claiming to have their own land, as well over forest resources with the village and forest administrations, guards, user groups, etc.

Implications: - Such external interventions (e.g. closure) create land pressure in the other land uses (farm, pasture and forest lands) and decline of indigenous seasonal movement of herds due to the scarcity of the land, which in turn may led to severe degradation of the resources.

Disputes/conflict resolution:- In addition, informants had also forwarded how they resolve such conflicts as indicated below:

i) Traditional institutions: - the local people have a well-developed indigenous mechanism to resolve conflict on sustainable basis. According to the informants, in the

study area there are different clans (*Gossa*) such as *Shedemma, Dooda, Abakorra Addaba, Hooditu, Seymenna*, etc. While, several lineages (*Belbela*) form a clan. Moreover, respected elders (and religious leaders) from the lineages try to resolve any conflict that may arise within the members of the *Belbela* (lineage) according to the traditional institutions (*Serra*). If one of the contestant's not satisfied (*Gumgume*) by the decision of the lineage elders can appeal to the upper traditional conflict resolving body at a clan level *(Bokku*) having *Alenge* (whip). *Bokku* – who selected in every eight years according to the *Geda* system. For example, if a male person killed, the clan belong to the killer should pay around 100 cattle and 50 cattle for a female as penalty and compensation. According to the informants most of the time the traditional mediation and arbitration, has favored by the local people because of the decision rely on the locally acceptable norms and cultural values. This implies the vital roles of customary mechanism of conflict management.

ii) Modern government and legal systems: - that is, *kebele* and *wereda* administrations, the rural and agricultural development and IFMP offices, police, justice and court systems. Try to resolve disputes and conflicts though formal laws, rules and regulations as facilitators, mediators and arbitrators in the process.

(iii) Alternative disputes settling mechanism: - In some cases Elders and religious committees as well as recently introduced *Golbicha* (according to the local language which mean that an umbrella of forest dwellers' association/FDA). Members of *Golbicha* were selected from each forest block under users' group in order to settling the disputes over forest resources. While, according the non-users' group respondents, as strategy to settle the arising disputes was not effective because of conflicts of interest or they were simultaneously winner and third party. Moreover, the customary arbitration seems more participatory while the modern laws and judgment process, is somewhat bureaucratic and it takes long time in many cases.

Generally, such external interventions directly /indirectly contributing for the farm and grazing lands and forest products shortage and decline of transhumant movement, crate pressure on the other land uses and generate conflicts

4.4 Deforestation as threat for the eco-tourism potential

The study area which is situated in the *Bale* Massife, is endowed by more than 12 perennial and several seasonal rivers and springs that drain to *Wabe* river basin, namely *Ukuma, Meribo, Leliso, Furuna*, etc. While, in and around this area some of the prominent peaks were Mt. *Darkena* (3899m), Mt. *Dodola* (4050m) Mt. *Ilale* (3655m) and other can be considered to be attractive landscapes for the eco-tourism industry.

Natural high forests, Afro-Alpine and other types of vegetations, which serve as womb of biodiversity, both discovered and undiscovered species of flora and fauna; serves also as buffer zone; and source of fishery. Moreover, sites like *Adele-Angatu, Horaarialle, Malka-Wakana* man-made lake, etc have high recreational values in order to promote tourist attraction.

The area is located adjacent to *Aloshe-Batu* and *Mena – Angetu* had been provided and opportunity for the movement of wildlife. According to the informant mountain *Nayala, Menelik's Bushbuk*, Great Kudus, Antelope, Leopard, Lion, etc were found. There was also diversity of bird species, including those peculiar to this country. As a result, the area had been ecologically green belt.

However, except the recent effort of environmental restoration, due to alarmingly high destruction of the forest, at present wildlife in and around the study area is very limited. In addition, because of deforestation and consecutive, soil erosion or denudation processes the landscapes partially have been lost its aesthetic or recreational values and attractive features. While, certain hill and rugged area, from which the vegetation cleared, overgrazed and exposed for the erosion and became barren lands (see annex 8). Hence, this may show clearly the on going environmental degradation, another dimension in the study area.

On the other hand, in line with the positive impacts of FDA conservation approach where the condition of the forests considerably improved, there is promising situation

for the development of eco-tourism in the area. In relation to this the Natural Resources Protection and Development Team Leader described the condition in the following terms "Currently we have seen re-coming of wildlife around *Adele* area such as: some groups of *Menelik* Bushbuck and the Ethiopian wolf, three groups of mountain *Nyala,* warthog, etc and birds species like Wattled Ibis, Lammergeyer, Yellow-fronted parrot, Thick-billed raven and so forth." Thus, this may indicate the tourism potential of the study area if the resources conserved properly in order to the sector to be a better source of income and employment to the local people, and to contribute even for the national economic growth.

5. Summary, conclusions and recommendations

This chapter presents a summary of the major findings of the study, conclusions drown from the findings and recommendations based on the summary and conclusions.

5.1 Summary

The purposes of this study were to identify the major causes of deforestation in the study area. Moreover, the thesis attempts to suggest some possible alternative ways/ means of alleviating the conditions. Based on these objectives, from the detail data analysis the following findings were obtained.

In the study area forest resources were seriously deteriorating, with the natural forest cover declining by more than 3 percent of deforestation rate per year. As a result, the tree cover has been decreasing over time.

As a result, in many areas status of the forest was reduced to highly disturbed and scattered conditions of the forest and also some of the indigenous tree types such as Hagenia abyssinca, Olea africana, etc were progressively decreasing including the inhabitant wildlife's.

In addition to the above estimated rate of deforestation by the forest administration deforestation for the communities attribute to the decline/loss of their traditional means of livelihood, shelter, sites of elders meetings and related cultural institutions and its ritual and other purposes of the forest.

While, as the data analysis further indicate that in certain hill and rugged areas, from which the vegetation cleared and exposed for the consecutive soil erosion or denudation processes, changed to barren lands.

Moreover, the small landholder farmers and other stakeholders were complaining about a decreasing productivity of soils from time to time because of the depletion of the fertility of the soil and the loss of the topsoil through water and wind erosion.

Based on the information obtained from the report of IFMP, the rate of soil erosion in the study area tends to be more than 20 tons of top soil per year, which in turn results in siltation threat for the *Malka Wakana* hydro-electric power station dam. That is, if the prevalent rate of siltation continues, the dam will lose its total water catchments capacity in 15-20 years.

An overwhelming majority sample householder, informants and different reports confirmed that causes of deforestation and its nexus were diverse and complex. Among others the following are some of the causes in the study area.

i. ***Uneven distribution of land holding and dependency on land***:- There was a significant difference in the landholding size among the peasant households, especially female headed families held the lowest land size. The results of the study revealed that those households who have relatively small land with large family size tends to be involved in fire wood selling that is harvested from the local natural forest (state owned) to subsidize their family income shortage. Moreover, landless people such as most of the new families established after 1991, unskilled youths, school dropouts, returned solders and poor women, were also involved in clearing the forestland for cultivation, settlement and wood harvesting for sale.

ii. ***Demographic pressure***: - The total number of people in the *Dodola* district within eleven years increased by one third. Likewise, in the two PAs. This implies increasing demand for, forest and land products under the tradational farm systems and poor conservation activities in order to restore the renewable natural resources.

iii. ***Expansion of the farm areas***: - During the *Derg* time this had contributed for the shortage of grazing and/or cropland and relocation of the local people to the marginal land (hillside), and forested land in the study area. Specifically, *Hererro*

state farm, which is located near to the two PAs from a total of 80 ha to 6127 ha land. This expansion of the farm area caused the eviction of peasants. These farmers started to live near and some in the natural forest and this was followed by over exploitation of land and forest resources. It is also source of complaints and disputes between the local people and the State Farm personnel.

iv. ***Inappropriate conservation measures***: - Under the customary property system forest /land resources were well protected/conserved. Moreover, in the regime the local people were not excluded from the use of common resources or the use rights were secured. Generally, before the revolution natural resources were in a better condition than in the later tenure system.

After the land/forest was nationalized especially the local natural forest was widely opened for several timber concessionaires. This led to unregulated logging without sufficient replanting activities. In addition, some of the low paid workers of the timber producing organization have introduced pit-sawing and charcoal production and through time many people were engaged in the illegal forest extraction activities.

By contrast, about 1,224 ha of forest plantation (state forest) and 2,188 ha of community forests (more of Eucalyptus tree) areas were covered through conservation activities in the district. However, in the transition period, the community forests and conservation structures constructed were destroyed.

Some of other measures taken by the government before 1995 were using controlling forest guards, wood and pit saws confiscation in order to protect the forest from encroachment. However, the conservation measures were not showing meaningful positive results. Moreover, based on the 1988 Ethiopian government request for the Federal Republic of Germany to assist in conservation, the IFMP was started in 1995 with a total of 12 years project period (1995 – 2006) in the study area.

Accordingly, some of the measures that have been taken by the project were: protection by forest guards; establishing forest protection committees at PA, *Wereda*,

Zonal and Regional levels in order to control illegal forest uses through mobilizing people's participation; village development activities (e.g. rural road); fencing of area closures to prevent grazing and encourage natural regeneration; etc. However, all of these activities did not create significant positive impacts and sense of ownership.

While, the FDA approach, which was launched in June 2000 and that guaranteed exclusive user-rights for 467 households in thee PAs, to manage more than 7,000 ha of forest land resulted the following positive effects:

- Forest condition in FDA managed areas considerably improved,
- The vegetation assessment or tree cover has shown an increase in tree cover by 5 percent by the year 2004,
- Increased quality of natural regeneration,
- Significant reduction in illegal tree harvest,
- Re-appearance of some wildlife species, etc

On the other hand, the following major undesirable effects of IFMP/FDA approach were identified:

- The project for many years did not get acceptance in the adjacent district (*Adaba*)
- Conservation through exclusive use rights only for the small number of members of the communities resulting;
    - Depriving of the large majority of the local people,
    - Aggravating access inequality to the local forest resources,
    - Exacerbating conflict between users' group and non-users' members of the communities; between families who have blood relations; etc
    - There was a suspicion that risks might arise from the fact that only a minority of farmers received the privilege of user rights.
    - Aggravating diverging of dung to use as fuel by non-user groups.
    - Competition for forest resources, before the remaining forest (around 27,000 ha) would be under FDA approach, in PAs such as *Keta-Berenda*, etc

Based on the information provided by the respondents, majority of the peasant families have low awareness about the environmental policy and laws and that revolving around the utilization and conservation of natural resources, while, some others reported that the laws were not appropriate to the local culture and customary practices. In addition, reluctance of the district administration to protect illegal forest encroachers, increasing of taxes and price of fertilizers, market challenges and the like, were also mentioned.

Moreover, as confirmed by the study in the long distant in the study area the dominant economic activity was pastoralism while due to shortage of land and other factors gradually mixed farming became the dominate agricultural activity. However, as the data computed in this paper implies that crop cultivation was the predominant activity (mainly wheat, *teff*, barley, etc).

In addition, the study indicates the decline of environmentally sound indigenous farm practices such as seasonal movement of herds, fallowing and crop species diversity, and increasing in the use of dung as fuel, selling and burning of crop-residues. Furthermore, in assessing farmers' tendency for the application of soil conservation techniques such as terracing, tree planting and other practices were very low while cut-off drainages technique was used moderately by the farmers in the study area.

v. ***Urbanization and demand for forest products***: Expansion of the surroundings urban areas and dwellers, wood workshops and wood markets resulted in the growing of demand for construction wood or timber, especially, that harvested from Hagenia, Juniperus, Podocarpus and Olea trees, were identified in addition to the dependency on the traditional sources of fuel (firewood and charcoal).

vi. ***Application of high-tech***: Extensive combine harvester and tractor services provision both by the public enterprise and private sector to the small land holders resulted in substituting the unskilled rural laboror, those who were harvesting for food or small wage payment and crop sharing, create dependency on technologies, contribute for the tendency of decreasing of important indigenous institutions such

as labor sharing (*wonfel*) and voluntary cooperation (*Jiggi*), and destroying soil conservation structures, etc.

vii. ***Conflicts on the use of land resources***: external interventions like conservation projects (e.g. closure, exclusive use rights etc), government farm areas expansion and dam construction induced shortage of land resources and create pressure on the other land uses (arable, grazing and forest) and aggravated disputes.

5.2 Conclusions

This research has tried to look into the factors of deforestation in the *Dodola* district and in the surrounding areas. In line with this and based on the major findings of the study, the following conclusions were drawn.

Priority Problem: As confirmed by the results of investigation deforestation was the major environmental problem in study area. the local natural forest cover was decreasing at an alarming rate over the years.

Different perceptions: Data analysis indicates that the forest cover was decreasing over the year, however, deforestation for the communities attributes to the decline/loss of the traditional purposes of forest. While the major claim may revolve around the experts' perceptions that tends to have partially conflicting views with the communities on the meaning of deforestation, which seems focus on the reduction of the quantitative and qualitative aspects of the forest.

Threat and livelihood: In addition to the estimated rate of the deforestation (3 percent) decreasing of the forest products/ purposes, reported that in some area change of forested lands to scattered patches, devoid and barren lands as a result of losing its vegetation cover and being exposed for soil erosion. Besides to the estimated rate of soil erosion (20 tons of top soil per year from the plots of farmers) perceptions of different stakeholders asserted that decreasing of the soil fertility in relation to the reduction of yields year to year. Thus, these may have bad implications for the quality of the basic sources of livelihood and ultimately for the life conditions of the rural communities in general.

Unemployment: Several young spouses, unskilled youths, school dropouts, returned solders and poor women have no land at all. As a result, those families who held relatively small land size under the traditional farm systems and large family size, and those landless members of the communities in area, where there are no alternative employment opportunities, were forced to resort to economic strategies which have a

negative impact on the forest (e.g. fuel wood production and lumber-making for sale and clearing the forestland for cultivation).

Population pressure: The ever increasing of population caused pressure on the forest resources, in the district and surrounding areas.

Expansion of farm areas: Agricultural expansions by the government farms caused the relocation of the local people and access restriction to grazing and/or cropland. As a result, the local people, were forced to settle near and in the forest as well as to clear the forest for cultivation, cultivate the hillsides, etc, Moreover, it was also a source of disputes. Therefore, the expansion of the cultivation area of government farms in the study area can be one of the factors for the shortage of grazing and/or cropland and its nexus.

Forest/land tenure: The forest/land tenure system (state ownership) and inappropriate conservation measures invited a lack of a sense of ownership, depletion of the resources and ignored the local use practices. By critics of the respondents some of the forest conservation measures complained, being heavily in favor of protection preservation and restoration of the forest while, less emphasis about the socio-economic, cultural and political aspects of the communities who had been living with the resources for centuries.

External approach: The FDA approach that provide exclusive use rights only for the minority groups, marginalized a large majority of the local people, depriving them of access to their legitimate or customary sources of livelihood; became a source of conflict over the resources and triggering forces of competition before the remaining large portion (around 80%) of the natural forest that stretched over *Dodola* and *Adaba* districts and which is endowed with indigenous tree species such as Hagenia abyssinica (*Kosso*), Podocarpus gracilior (*Zigba*), Juniperus procera (*Ted*) and the like. In addition, the approach was criticized for its impact that encourages the existing structure of inequality and become sources of disputes with in communities and families who have traditional linkage and blood relations.

Level of awareness: The research indicates, farmers have low awareness about the conservation and use laws of the regional government, while some others were also reported that they were not in favor of the laws being inappropriate the local culture and use practices. Besides to this commitment in putting the laws in practice by the responsible government bodies also insignificant when it was compared to the degree of deforestation. As a result, social acceptance and feasibility of the laws, was not encouraging. Generally, such conditions may attribute to the lack of active public participation and all the other stakeholders during policy/strategy formulation and implementation, lack of commitment to empower (control over the local forest/land resources) and overlook the traditional practices.

Lack of appropriate land husbandry: Poor farm practices such as continuously cultivating field plots or reducing fallowing because of the land shortage, growing narrow crop species diversity, diverging dung's as fuel source, selling and burning of crop-residues, decline of seasonal movement of herds that led to overgrazing, and insufficient soil management techniques such as lack of proper terracing, insignificant tree planting etc.

Inappropriate technologies: Destruction of the existing soil structures by tractors, combine harvesters and Lorries, in addition, to the prevailing rate of destruction of the natural forest, and undulating land feature and shallow soils depth and other factors have contributed for the local land degradation. While, forest and soil conservation activities in the study area can be incompatible and insufficient to the local contexts and to the scale of depletion of the resources. Moreover, the process of substituting the unskilled rural labor forces by tractors and combine harvesters has resulted in encouraging unemployment. Hence this forces the poorest of the poor to cut trees and sell for survival.

Expansion of urbanization: Fast increasing of the surroundings urban areas and dwellers, expansion of wood workshops and markets resulted in the increasing of demand for construction wood or materials, especially, that harvested from Hagenia abyssinica, Juniperus poraceria, podocarpus faleatus and Olea africana. This was

accompanied by the shortage of other energy sources such as low access to HEP supply and relatively its high cost and the like, identified as factors high cost and the like, identified as factor for the dependency of the people on the traditional sources of fuel (firewood and charcoal).

Source of conflicts: External interventions measures of conservation projects, state farms and dam construction, such as closure create pressure in the other land uses (arable, pasture and forest) and became a sources of conflicts on the use of land resources. Moreover, this also may encourage, some the peasant families, vulnerable to the challenge, to clear/cut forestland to use for cultivation, grazing and for sell in order to resolve their livelihood insecurity. Furthermore, the prevalence of disputes, especially, between the minority of FDA (Forest Dweller's Association) and the large majority of the non-FDA members of the communities may indicates the potential of threat for the future massive forest destruction as act of protest, based on the past experience of Ethiopia, during the transitional period. In general, such undesirable effects of development projects may attributes to the failure of experts/planners or policy makers, to consider the local situations and culture of the peasant communities in the planning of the intervention measures.

5.3 *Recommendations*

In light of the findings and conclusions drawn, the following recommendations are forwarded.

Addressing complexity and diversity

The result of the investigation revealed that the local natural forest and soil resources are progressively being depleted. While the large majority of population of the district particularly in the rural area, entirely depends for their daily livelihood on the local environmental resources. Thus, conservation and sustainable utilization of these resources, is crucial.

Therefore, in order to mitigate the complex and diverse challenges, it may advisable to take the following measures by the government.

- Return the land under the State Farms to the local farmers, particularly for those landless and poor women, whose incomes entirely depend on firewood selling, to reduce environmental costs.
- Creating different labor-intensive employment opportunities.
- With regards to the application of high-tech, it is advisable the government to encourage labor-intensive farm technologies that help to use and maximize human energies and animal draft inputs.
- Provide sound family planning and reproductive health trainings and services, especially in the rural area and design strict population policy in the long run.
- Facilitate the expansion of alternative energy sources, training and fuel saving technology diffusion in order to reduce dependency on the traditional sources of fuel (e.g. charcoal, and firewood);
- Promoting environmental education and awareness.

Sustainable use of resources

The ongoing deforestation and consecutive deterioration of the forest landscape call for urgent and appropriate actions to the local contexts such as effort to mobilize the communities and all other concerned stakeholders to maintain and improve vegetation cover of the area. The following specific recommendations were made:

However, development project should provide equal emphasizes on the condition of social relations and conservation schemes that enhance the livelihood security of the local communities through recognition of their customary use rights over the locally available major resource basis/legitimate sources of livelihood and external intervention for development need to have concern to the communities, who will be directly and indirectly affected by the measures, through appropriate compensation, etc.

Hence, conservation and use laws also should be adjusted to the local contexts and tuned to human centered, in order to get social acceptance, a chance of feasibility and success in general.

Improving the cover contributes to stop the direct impact of the rainfall erosivity and increase the water infiltration, and decreasing the soils erodibility through improving the soils resistance to disruption (improving the soil structure or stability of aggregate); using compost and mulching (add crop residues to protect the soil from rainfall drop effect and improve the soil fertility); using farmyard manure; timely planting once the seed bed is prepared; agro-forestry, etc are recommended in order to mitigate soil erosion and decline of soil fertility. Moreover, land/soil management techniques need to be combined with agronomic methods to protect erosion, by intercepting run-off (not build energy and accelerate) at different stages. This can be done through changing the topography that is terracing or building structure. All these possible through well designed appropriate land use planning.

Further research need to be made on conflict over natural resources and on environmental, social and economic impacts of *Malka Wakana* dam in depth.

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Annex 1A

LIST OF INFORMANT FARMERS

No	Name	Village	Position
1	Adula Wakeyo	Berisa PA	Youth
2	Ogete Araresso	Berisa PA	Informant farmer
3	Geresu Hussen	Berisa PA	Informant farmer
4	Suletan Kalu	Berisa PA	Elder
5	Kabeto Semu	Berisa PA	Informant farmer
6	Erebo Kabeto	Bura-Adele PA	Informant farmer
7	Hussen Chebo	Bura-Adele PA	Elder
8	Kedero Tewecha	Bura-Adele PA	Elder
9	Shure Ejara	Keta – Berenda PA	DA
10	Gemeda Rameto	Bura-Adele PA	Informant farmer
11	Germa Kabeto	Berisa PA	Informant farmer
12	Kemal Eberahime	Bura-Adele PA	Informant farmer
13	Bekere Alake	Berisa PA	Chairman of the village
14	Tariku Kebede	Keta – Berenda PA	Youth
15	Setu Guremu	Keta – Berenda PA	Chairman of the village
16	Sore Hunde	Keta – Berenda PA	Elder
17	Horedofa Tebo	Keta – Berenda PA	Elder
18	Hussen Kimo	Keta – Berenda PA	Elder
19	Abduraman Hebo	Keta – Berenda PA	Informant farmer
20	Jarso Dinky	Keta – Berenda PA	Elder
21	Esey Drese	Keta – Berenda PA	Youth
22	Edirise H/Hassen	Berisa PA	Elder
23	Bilisea Guya	Berisa PA	Informant farmer

Annex 1B

LIST OF OFFICIALS AND EXPERTS INTERVIEWED

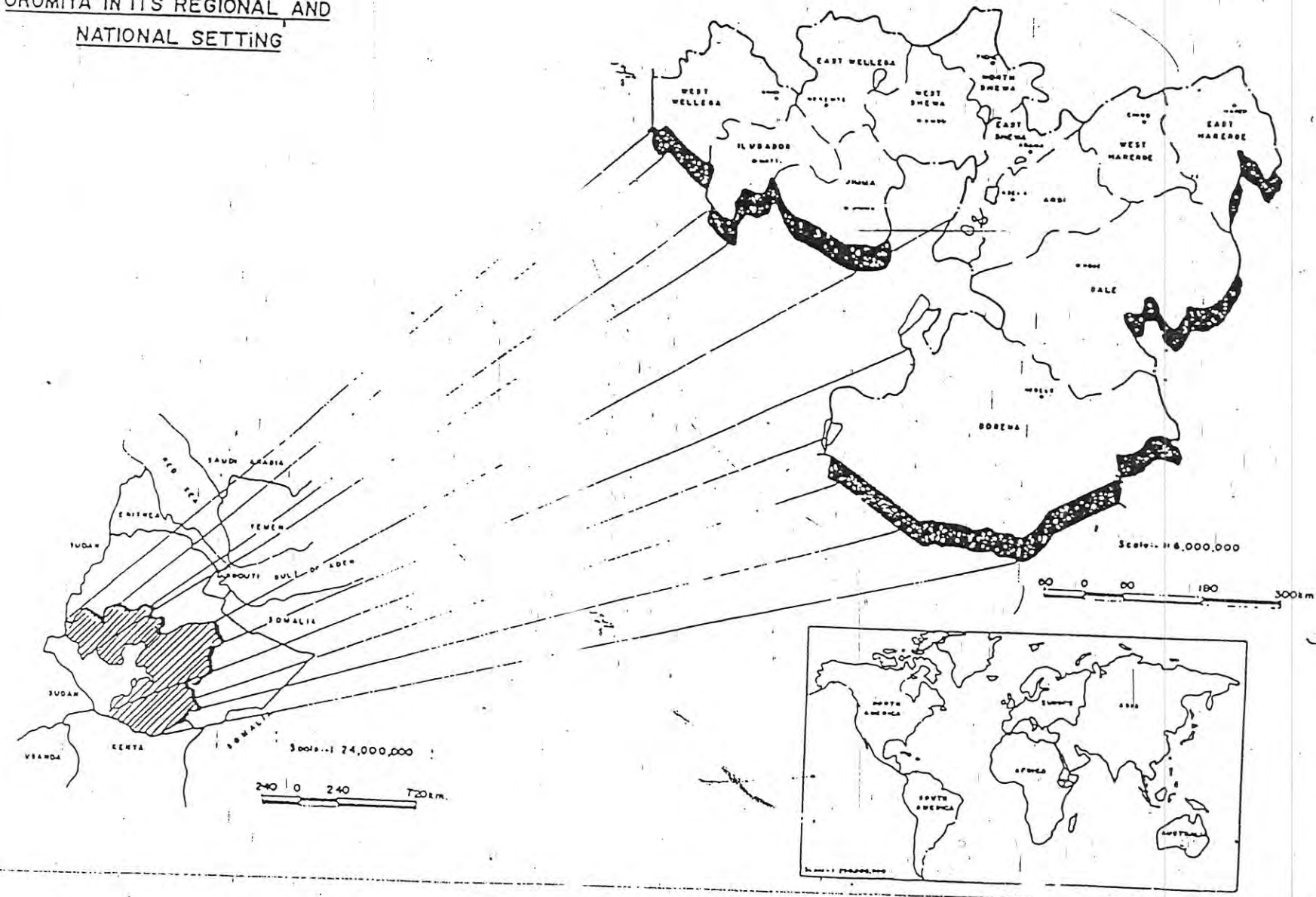
No	Name	Position	Organization
24	Syeoum G/Kidan	Rural Land Administration and Natural Resources Development and Conservation, and Rural Energy Expansion Section Head	Dodola District RADO
25	Solomon H/Mariam	Rural Land Administration and Natural Resources Development and Conservation Expert	Dodola District RADO
26	Kassahun Tegne	Forest Development Expert	IFMP Adaba – Dodola
27	Eshetu Kassa	Soil Conservation Expert	Dodola District RADO
28	Bezabehi W/Semaite	Soil Conservation Expert	Dodola District RADO
29	Deju Werjina	Livestock Development Section Head	Dodola District RADO
30	Ketema Demese	Planning and Information Expert	Dodola District RADO
31	Aserate Mengesha	Project Adviser (GTZ)	Dodola District RADO
32	Aklilu Ameha	Project Manager and Forestry Team Leader	IFMP Adaba-Dodola
33	Shemeles Kefeyalew	Project Manager	Hererro State Farm
34	Solomon Yemere	Expert	Hererro State Farm
35	Kassa Sentayehu	Investor	Private
36	Alemu Demesse	Director	School
37	Getahun Teffere	Teacher	School
38	Habetamu Maru	Member of the District Administration	District Administration
39	Tegene	Expert	Dodola District RADO

Annex 2

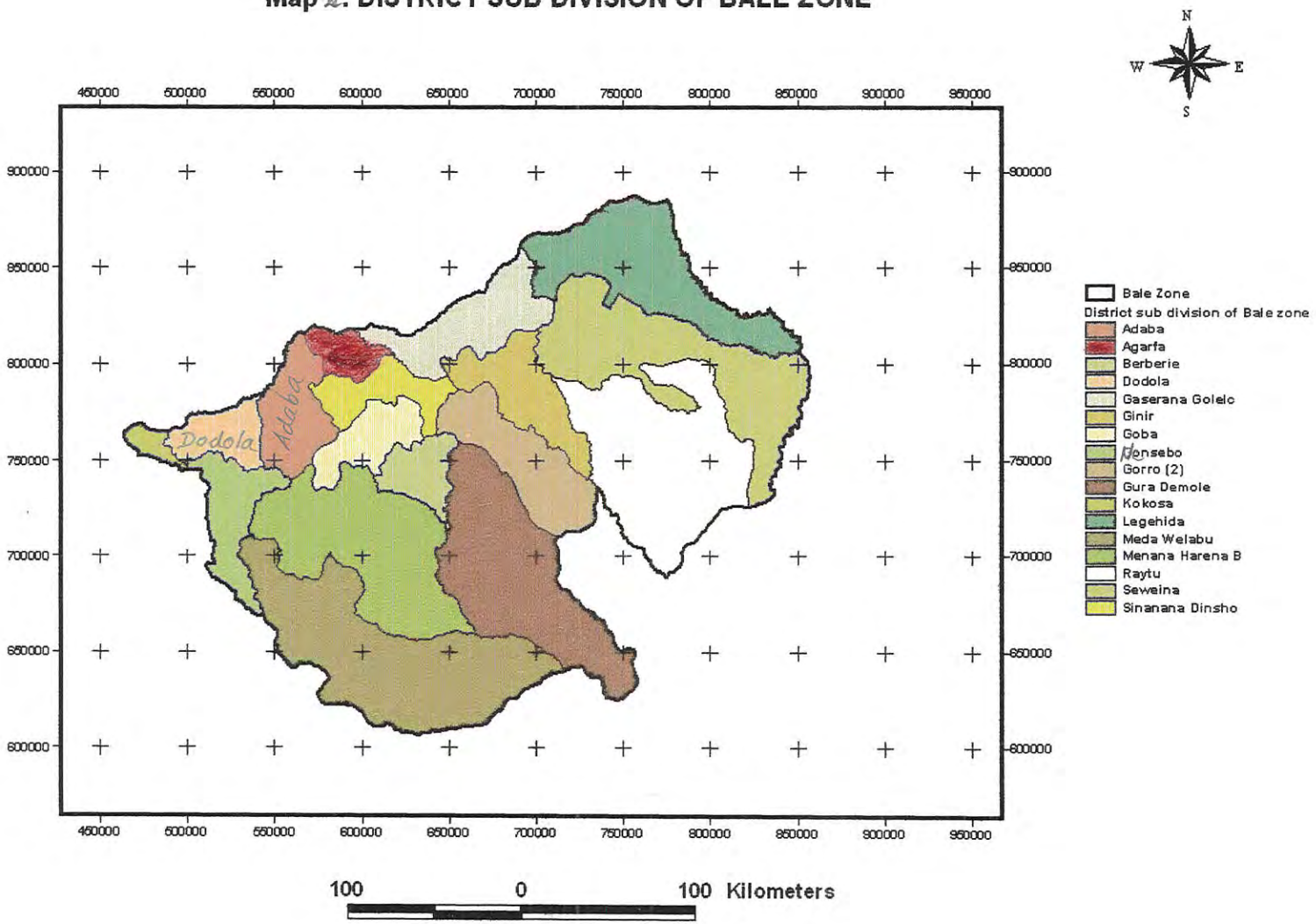
Map 1:

REGIONAL STATE OF OROMIYA

OROMIYA IN ITS REGIONAL AND NATIONAL SETTING

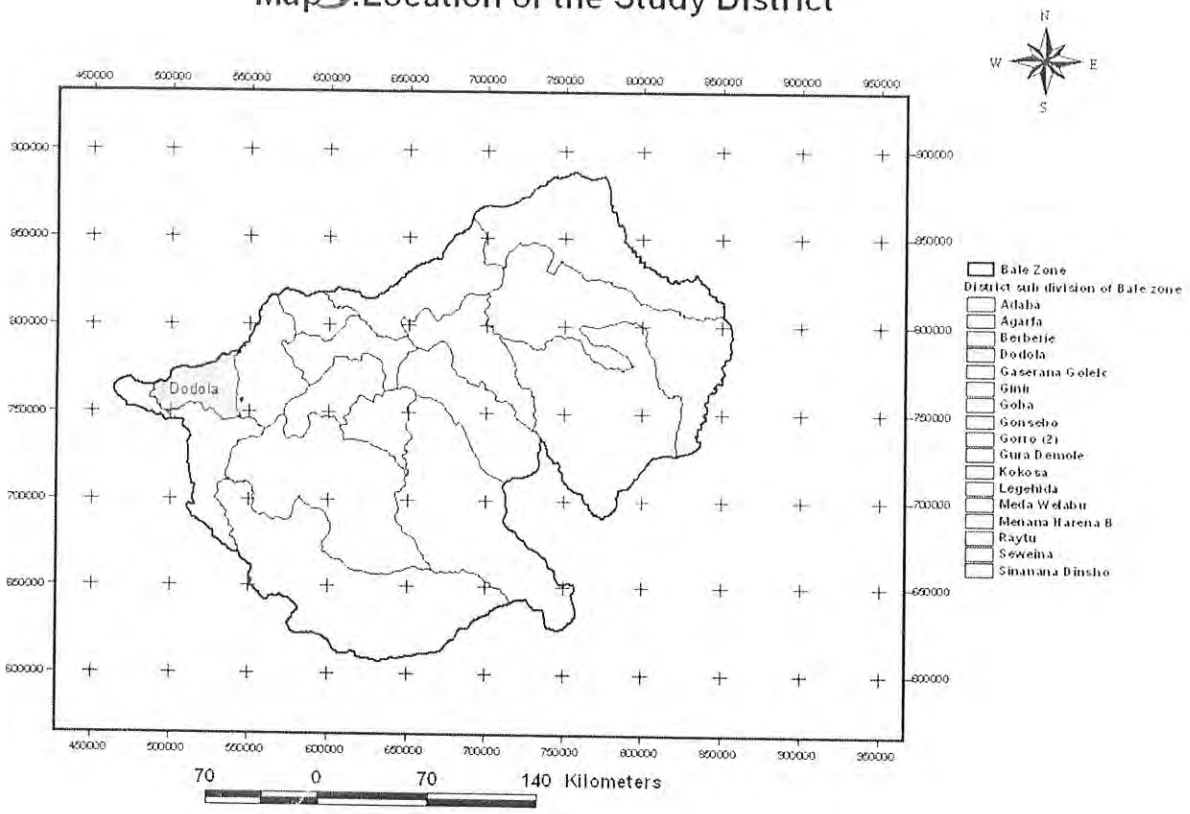


Map 2: DISTRICT SUB DIVISION OF BALE ZONE



Annex 2

Map3:Location of the Study District



Annex 3

ENVIRONMENTAL DEGRADATION HOUSEHOLD QUESTIONNAIRE

WRITE THE RESPONSE IN THE BLANK SPACE

Name of enumerator _____ Date [dd/mm/yy]
Interview started at (local time): _____
Finished at (local time): _____
Interview identification number [HH ID] : Serial No._____

PART 1. GENERAL INFORMATION

1.1 *Kebele* / Village: _____
1.2 Sex of the respondent: _____
1.3 Age of the respondent: _____
1.4 Educational status of the respondent: _____
1.5 Language of the respondent: _____
1.6 Religion of the respondent: _____
1.7 Ethnic origin on of the respondent: _____
1.8 Family size of the respondent: _____
1.9 Respondent duration (in years): _____

2. HOUSEHOLD MEANS OF LIVELIHOOD

Please use tick mark (✓) answers of the respondents

2.1 Do you have livestock?

Yes = 1 No = 2 (Go to Q. No. 2.3)

2.2 If "yes", then (Indicate the number)

Animal	Number
2.2.1 Oxen	
2.2.2 Cows	
2.2.3 Heifers	
2.2.4 Bull	
2.2.5 Horses	
2.2.6 Donkey	
2.2.7 Mules	
2.2.8 Goats	
2.2.9 Sheep	
2.2.10 Poultry	

2.2.11 Others (Please Specify): _____

2.3 Do you own land?

Yes = 1 No = 2 (go to Q. No. 2.5)

2.4 If "yes", then what is the total land holding of the household? (in hectare) ___
(Use decimal number such as: 0.5, 0.25 etc ha)

TYPE OF LAND	UNIT In hectare
2.4.1 Crop land	
2.4.2 Grazing land	
2.4.3 Forest land (woodlot)	
2.4.4 Others (e.g. Garden for vegetables etc)	
Total	

2.5 What is the main occupation of the household?

Crop production = 01 Animal husbandry = 02
Mixed Farming = 03 Trading = 04
Other (Specify): _____

2.6 Does your household have supplementary income?
Yes = 1 No = 2 (go to Q. No. 3.1)

2.7 If the answer for the question No. 2.6 is "yes" what is the source of supplementary income?

2.7.1 Crop production: Yes = 1 No = 2
2.7.2 Animal husbandry Yes = 1 No = 2
2.7.3 Mixed farming Yes = 1 No = 2
2.7.4 Trading Yes = 1 No = 2
2.7.5 Wood selling Yes = 1 No = 2
2.7.6 Bee keeping Yes = 1 No = 2
2.7.7 Daily labour Yes = 1 No = 2
2.7.8 Others (Specify): _____

3/. REGARDING LOCAL NATURAL RESOURCES
FOREST RESOURCES

Please put a tick mark (✓) next to the answer provided by the respondent.

3.1 Do you have easy access to forest resources?
Yes = 1 (go to Q. No. 3.3) No = 2

3.2 If the answer for question No. 3.1 is "no", why not?
3.2.1 Exclusive use-rights Yes = 1 No = 2
3.2.2 The forest is at remote location: Yes = 1 No = 2
3.2.3 Other (Specify): _____

3.3 For what purpose do you use forest resources?
3.3.1 Fuel wood Yes = 1 No = 2
3.3.2 Animal feed Yes = 1 No = 2
3.3.3 Sale fuel wood Yes = 1 No = 2
3.3.4 Construction Yes = 1 No = 2
(E.g. house, fence, etc)
3.3.5 Medicine (herbal) Yes = 1 No = 2
3.3.6 Fruit /food Yes = 1 No = 2
3.3.7 Honey source Yes = 1 No = 2
3.3.8 Others (Specify): _____

3.4 Do your household plant tree?

Yes = 1 No = 2 (go to Q. No. 3.7)

3.5 If the answer is "yes" to the above question describe the type and number of trees?

Type	Number of trees

3.6 If the answer is "yes" to question number 3.6, for what purpose does plant tree?

3.6.1 Sale: Yes = 1 No = 2

3.6.2 Fuel wood: Yes = 1 No = 2

3.6.3 Construction (house, fence, etc) Yes = 1 No = 2

Conservation Yes = 1 No = 2

3.6.4 Other (specify): _____

3.7 What type of fuel does your household use for cooking?

3.7.1 Wood Yes = 1 No = 2

3.7.2 Leaves Yes = 1 No = 2

3.7.3 Stalk/crop residues Yes = 1 No = 2

3.7.4 Animal dung Yes = 1 No = 2

3.7.5 Kerosene Yes = 1 No = 2

3.7.6 Other (specify): _____

3.8 What are the three major source of fuel for your household? (Prioritize and indicate the term or write in words).

3.8.1 The first major source of fuel: _____

3.8.2 The second major source of fuel: _____

3.8.3 The third major source of fuel: _____

3.9 Do your household need fuel wood for sale during seasonal food insecurity or lack of income?

Yes = 1 No = 2

3.10 Is there scarcity of firewood in your community?

Yes = 1 No = 2 (go to Q. No. 3.12)

3.11 If the answer is "yes" for the question 3.10 describe thing that your family used as fuel during scarcity of firewood?

3.11.1 Animal dung Yes = 1 No = 2

3.11.2 Stalk/crop residues Yes = 1 No = 2

3.11.3 Kerosene: Yes = 1 No = 2

3.11.4 Others (Specify): _____

3.12 Have you been trained on how to use better fuel saving alternatives?

Yes = 1 No = 2 (go to Q. No. 3.14)

3.13 If "yes", for the above question for how long you get training? _____ (Days)

3.14 What is the current natural forest resource ownership condition in this *wereda*?

Private = 01 Government/public = 02

Communal = 03 Open access = 04

Other (Specify): _____

3.15 What is your opinion about the current forest ownership condition in this *wereda*?

Very Good = 01 Good = 02

Indifferent = 03 Bad = 04 Very bad = 05

3.16 If the answer for question number 3.18 is "bad or very bad", then what do you think is the best option in your situation?

Private Ownership = 01 Government/public ownership = 02

Communal ownership = 03 Open access = 04

Others (specify): _____

3.17 What do you think about the current forest resource condition in this *wereda*?

Excellent condition = 01 Good condition = 02

Moderate = 03 Degraded = 04

Very much degraded = 05

3.18 How do you compare the current forest condition before 10/20 years?

Very much improved = 01 Improved = 02

The same = 03 Degraded = 04

Very much degraded = 05 I don't know = 06

3.19 If the answer for question number 3.21 is "degraded or very much degraded", what do you think are the possible reason(s)?

3.19.1 Displacement caused population pressure	Yes = 1	No = 2
3.19.2 Inappropriate tenure system	Yes = 1	No = 2
3.19.3 Natural process	Yes = 1	No = 2
3.19.4 Investors intrusion	Yes = 1	No = 2
3.19.5 Settlement programs by government	Yes = 1	No = 2
3.19.6 Weak government regulation /control	Yes = 1	No = 2
3.19.7 Population pressure	Yes = 1	No = 2

3.19.8 Others (Specify): _____

3.20 Are you aware of forest resource conservation and use laws of the government?

Yes = 1 No = 2 (go to Q. No. 3.22)

3.21 If "yes" to the above question then are the laws appropriate to your locality?

Yes = 1(go to Q. no. 2.23) No = 2

3.22 If the answer for the above question is "no", then why? Explain _____

_____

3.23 Is there any dispute over forests? Yes = 1 No = 2 (go to Q. No. 3.25)

3.24 If the answer is "yes" to the above question why? Describe _____

_____

_____

REGARDING LAND RESOURCE

3.25 Do your household use fertilizer for agricultural activities?

Yes = 1 No = 2 (go to Q. No. 3.28)

3.26 If "yes" to the above, which of the following that you used?

3.26.1 Chemical fertilizer Yes = 1 No = 2

3.26.2 Animal during Yes = 1 No = 2
3.26.3 Crop residues /stalks/ Yes = 1 No = 2
3.26.4 Other (specify) _____

3.27 If your response is "yes" to chemical fertilizer, please, describe the average amount in kg/ha_____

3.28 Does soil erosion is a major phenomenon in this area?
Yes = 1 No = 2

3.29 Does your household farmland have soil erosion problem?
Yes = 1 No = 2 (go to Q. No. 3.31)

3.30 If the answer is "yes" to the above question, does it have product reduction impact?
Yes = 1 No = 2

3.31 Is there any indigenous farm practice used by your household to improve the land productivity?
Yes = 1 No = 2 (go to Q. No. 3.33)

3.32 If "yes", for the above, what kind of measure your household takes?
3.32.1 Fallowing Yes = 1 No = 2
3.32.2 Corp rotation Yes = 1 No = 2
3.32.3 Using organic fertilizer Yes = 1 No = 2
(e.g. dung, crop residues, etc)
3.32.4 Others (specify): _____

3.33 If the answer is "yes" to the question 3.29, which of the following soil conservation measure taken by your family?
3.33.1 Soil conservation structures/ bandings Yes = 1 No = 2
3.33.2 Contour till Yes = 1 No = 2
3.33.3 Cut-off drainages Yes = 1 No = 2
3.33.4 Tee planting Yes = 1 No = 2
3.33.5 Grass Yes = 1 No = 2
3.33.6 Others (Specify): _____
_____

3.34 Is there land resource scarcity problem at your village?
Yes = 1 No = 2

3.35 If the answer is "yes" to the above question, what are the major causes?
3.35.1 The state farm induced access restriction Yes = 1 No = 2
3.35.4 Rapid population growth Yes = 1 No = 2
3.35.3 Natural process Yes = 1 No = 2
4.35.4 Others (Specify): _____

Annex 4

KEY FARMER INFORMANT DEPTH-INTERVIEW GUIDE

Date: _____ Serial No: _____
Name of the Respondent: _____
Age: _____
Sex: _____
Special Status: _____
Duration in the Area: _____
Village: _____
Educational Status: _____

FOREST RESOURCES AND CONSERVATION ACTIVITIES

1. What sort of environmental resources are the major endowment of the area?
2. To what extent the area was covered by forest before the revolution?
3. How do you think about the current forest resources conditions in this area?
4. How do you compare the current forest conditions with that of 10 to 20 years or before? Explain
5. For what purpose, the local people need and use the forest resources?
6. What is your opinion about the past forest tenure in this area?
7. What is the current forest resource ownership in this area?
8. What are the indigenous experiences of the communities with forest resources conservation? What are the rules for use of forest products? How was the application?
9. Is there scarcity problem of fuel wood and non-fuel wood scarcity in this area?
10. What kinds of coping strategies do different families during the scarcity of fuel wood and non-fuel wood forest products?
11. Have the local people get any training on how to use better fuel conserving alternatives? For how long?
12. Is there and dispute over forest products/resources?
13. If "yes", to the above question why it occurred? What are the major types of conflict? Who are the parties? When, who, where and how resolved?
14. Explain any agreement among the local people that has been made with regard to the use of forest resources in this area?
15. What do you propose that the scarcity of forest products to be solved and forests to be secured/sustainable?
16. Is there reforestation/afforestation scheme in this locality?
17. Is there a community forest in this area?
18. How do you evaluate the effectiveness of government institutional control for protection of the forest resources?
19. Have there any support activity by non-governmental organization and the like to improve forest resource management activities in this *wereda* locality?
20. If "yes", who are the supporting organizations for the forest resources management activities in this locality
21. In your opinion, which forest conservation activity provided by the NGOs and government effective in for the conservation of the forest?

22. In your opinion, from the forest conservation activities provided by the NGOs and government, which ones should be avoided?
23. Is there an undesirable effect of forest resource conservation and management in this locality?
24. If "yes", then which factors lead to such effects?
25. If the answer is "no", what do you think are the reasons?
26. How do you compare the rate of deforestation and the rate of reforestation /a forestation in this *wereda*?
27. What do you suggest about what has to be done, to fill the gap?

LAND RESOURCES AND FARMING

28. What kind of tenure system did exist before the land reform of 1975 in this in the area?
29. What sort of traditional farming systems were common in this area in the past?
30. What experience did the community had in the past in terms of common resources utilization? What are the rules? Which rule is under use?
31. What are the major types of soils in this area?
32. What were commonly found types of livestock? How this changed over time?
33. Is there land scarcity in this area? If so why?
34. What are the economic impacts of crop and grazing land scarcity?
35. What are the social and cultural impacts of cropland grazing land scarcity?
36. What are basic environmental impacts of cropland and grazing land scarcity?
37. To what extent different households use chemical fertilizers, pesticides, insecticides and herbicides?
38. To what extent peasants' farmlands have soil erosion and depletion of soil fertility?
39. How do you evaluate yields of peasant households over time, does it increasing or decreasing? Why?
40. What are the major causes of land degradation?
41. How do you perceived the negative impacts of land degradation for peasant families?
42. How do you evaluate the possible challenge of soil erosion for the local rivers catchments and banks such as siltation, etc?
43. Which sort of coping strategies, that further different household of the peasants do, can damage forests?
44. Which kind of coping strategies, damage soil fertility?
45. What sorts of indigenous soil conservation experiences and farm practices were commonly implemented?
46. Which of the local traditional farm practice declined to be practiced, such as following, crop rotation, organic fertilizer, etc? Why?
47. How these changed over time?
48. What are the basic soil conservation activities in this area? By which actor?
49. To what extent the existing soil conservation activities are effective?
50. What do you propose alternative solutions to tackle soil erosion?

REGARDING LARGE SCALE DEVELOPMENT PROJECTS IMPACTS

51. Is there a large-scale development project such as: State Farm, etc establishment in or near to your community?
52. If "yes", to the above question, has been induced the relocation of local people?
53. To what extent displacement of local settlements has resulted?
54. Did the project cause loss of arable land to your household or community?
55. If "yes" to the above, what are different families do as coping strategy for shortage of cropland?
56. Did the project caused loss of grazing land to your household or community?
57. If "yes" to the above, what coping strategies families use for the shortage of grazing land?
58. Was the community loss access to forest resources as a result of the introduction of the project? Describe
59. Do you perceived competition and conflict over natural resources?
60. What are the major sources of disputes?
61. How have the disputes been addressed by formal institutions?
62. How have these disputes been addressed by informal institutions? (Alternative conflict resolution mechanism e.g. elders committees)
63. What was the traditional sharing in social relations?
64. What is the exiting sharing in social relations?

CLOSING QUESTIONS

65. What are the major forms of environmental problems in this area? Describe
66. How do you evaluate the role of large-scale development projects for the existing environmental problems?
67. How do you evaluate the role of large-scale development projects for the depletion of indigenous sound farm practices?
68. How do you evaluate the ultimate consequences of deforestation?
69. How do you evaluate the ultimate consequences of soil depletion?
70. What solutions do you propose to mitigate the major environmental problems in this area?

Annex 5

OFFICIALS AND EXPERTS - INFORMANT INTERVIEW GUIDE

Date: _____ Serial No. _____
Name: _____
Previous Position _____
Duration _____
Current Position _____
Duration _____
Place _____
Educational Status _____

1. Customary land tenure and common resources use changes over time? Why? How?
2. Indigenous farming systems and how it is changed over time? Why? How?
3. Indigenous farm practices and related institution change over time? Why?
4. Average cropland holding in the *wereda*/village?
5. Conditions of grazing land and livestock change over time? Why? How?
6. Average households yield per hector? How it is changed over time? Why?
7. Major economic activities in the rural areas of the *wereda* and supplementary (off farm and non farm) income sources involvement of small holds?
8. Peasant households' access to forest resources?
9. For what purposes the rural people need forest products?
10. Is there a community forests in the rural areas?
11. What they (peasants families) do as coping mechanism during fuel wood crises?
12. What they (farmers families) do as coping mechanism during seasonal income insecurity (e.g. before harvest/in the summer season)?
13. To what extent the local people plant trees for household need and conservation?
14. To what extent different trainings are provided to the rural people in relation to better fuel conserving alternatives in the area/*wereda*?
15. What is the past and the current forest resources ownership condition in this area/how do you evaluate it?
16. What do you think about the forest resources conditions in this area in the past (total forest coverage)?
17. How much the annual rate of deforestation and trends overtime?
18. How do you compare the current forest condition with that of which was before 10/20 years (or above) and the large-scale development projects established in the area?
19. Do you know the annual rate of soil erosion and the trend overtime?
20. How do you compare the current soil condition with that of which was before 10/20 years (or above)?
21. What do you think about the impacts of State Farms, etc?
22. Which form of environmental problem is major in this area?
23. What do you think about the possible causes?
24. What are coping strategies of the local people to over come the adverse effect of environmental degradation?
25. What is your opinion about the forest resources conservation and use laws of the government? It is feasible? Do people are aware?
26. What is your opinion about the forest resources conservation activities of IFMP impacts in this area?

27. Have there been any successful efforts in terms of forest resources conservation and management in and around this district?
28. Which factors lead to that success or failure leads in the past?
29. Have any successful effort in terms of soil and water conservation activities and laws in this area?
30. To what extent soil conservation structures on-farms, and off-farms and planting trees performed in this area?
31. Is there scarcity of natural resources? Why? What are the consequences?
32. Is there competition and dispute over natural resources? Why it occurs? How it is solved?
33. What solutions generally you proposed for sustainable utilization and conservation of the local major natural resources?

SUMMARY OF OBSERVATION CHECKLIST

1. Extent to which forest areas have been affected
2. Extent to which riverine belts have been affected
3. Extent to which biological diversity is affect (e.g. types of trees, wildlife, etc)
4. Extent to which forest products (both non-timber and timber/have been affected
5. Extent of forestlands cleared for settlements, cultivation, grazing, logging etc.
6. Evidence of soil degradation, erosion, reduction of fertility, etc.
7. Extent to which traditional conservation measures (e.g. fallowing etc) have been affected
8. Extent to which modern conservation measures have been instituted and implemented
9. How these changed over time?

Annex 6

መግቢያ፣

በባሌ አርሻ ልማት ድርጅት ስር የሚተዳደሩ አርሻ ልማቶች ሐረሮ፣ ሲሮፍታ፣ ሁንጤ፣ ሮቤና ሲናና ሲሆኑ በአጠቃላይ 16349ሄ. ይሠታ ያለው ሲሆን ከዚህ ውስጥ 15956ሄ. የለማ ነው። ተሪው ለመካናይዜሽን አመቺ ያልሆኑ ቦታዎችና ሌሎች መሠረተ ልማቶች ያረፉበት ነው።

የአርሻ ልማቶች የአፈር ዓይነትና ቶፖግራፉ

አርሻ ልማት	የአፈር ዓይነት	ቶፖግራፉ	ከባህር ጠለል በላይ ከፍታ በሚ	የመሬት ይዞታ	
				የለማ	ጠቅላላ
ሐረሮ	Clay Loam Sandy clay Loam	መጠነኛ ተዳፋትና ሚዳማ	2300-2400	3592	3662
ሁንጤ	Clay Loam & heavy clay loam	መጠነኛ ተዳፋትና ሚዳማ	2380	2215	2264
ሲናና	Clay & Partially Clay Loam	ወጣ ገባና በከፊል ሚዳማ	2370-2450	3838	3888
ሮቤ	Clay & Partially Clay Loam	ሚዳማና መጠነኛ ወጣገባ	2470	2565	2694
ሲሮፍታ	Clay , Clay Loam & heavy Clay loam	ወጣገባና መጠነኛ ተዳፋት	2580	3746	3841

በሰብል ማምረት ሂደት ውስጥ በየአርሻ ልማቱ ጐልተው የሚታዩ የአግሮኖሚ ችግሮች የአፈር መለድ ተባይ፣ የሰብሉ በሽታ የንረም ወረራና የአየር ንብረት መዛባት ናቸው።

አንድ ዓይነት ሰብልና ኬሚካልን ከመጠቀም አኳያ የመጣውና አሳቻሪ የሆነው የንረም በኬሚካሎች የተፈጥሮ መከላከያ /Resistance Development/ ማበጀት አሣሪ ሆኗል። የተጠቀሱት ችግሮች መንስኤውንና የሚያስከትሉትን የምርት ቅነሳ ከግምት ውስጥ በማስገባት በመልካሳ አርሻ ምርምር ማዕከል ድርጅቱ ባዘጋጀው የአግሮኖሚ አውደጥናት ላይና ከዚያ በኋላም በአወቀት ዘር ኢንዱስትሪ ኤጀንሲ ከአርሻ ተመራማሪዎች፣ ጉዳይ ከሚመለከታቸው መስሪያ ቤቶችና የኬሚካል ኩምፓኒዎች ጋር በተደረገው ውይይት መሠረት ምርታማነትን ለማሳደግ የሚያስችል ስልት ተቀይሷል።

በአውደ ጥናቱ ላይ የተካተቱ አግሮኖሚክ ነጥቦች፣

- ወቅቱን የጠበቀና ለሰብሉ ተስማሚ የማሣ ዝግጅት
- ትክክለኛ የዘርና ማዳበሪያ አጠቃቀም
- የሰብልና ዝርያ አመራረጥ
- የሰብል ፈረቃ አጠቃቀም
- ከምርት ማምረት ጐን ለጐን ሰለ መከላከ ሥራዎች አስፈላጊነት
- ሰለ ዓረም ቁጥጥር /በማሣ ዝግጅት፣ በሰብሉ ፈረቃ በኬሚካል፣ መሬት በማከር..... ወዘተ/ በመሳሰሉት ነጥቦች ላይ ሰፋ ያለ ጥናታዊ ውይይት ተደርጓል።

Annex 7

Table 2.3 Forest changes by regions in Ethiopia between 1973 and 1990

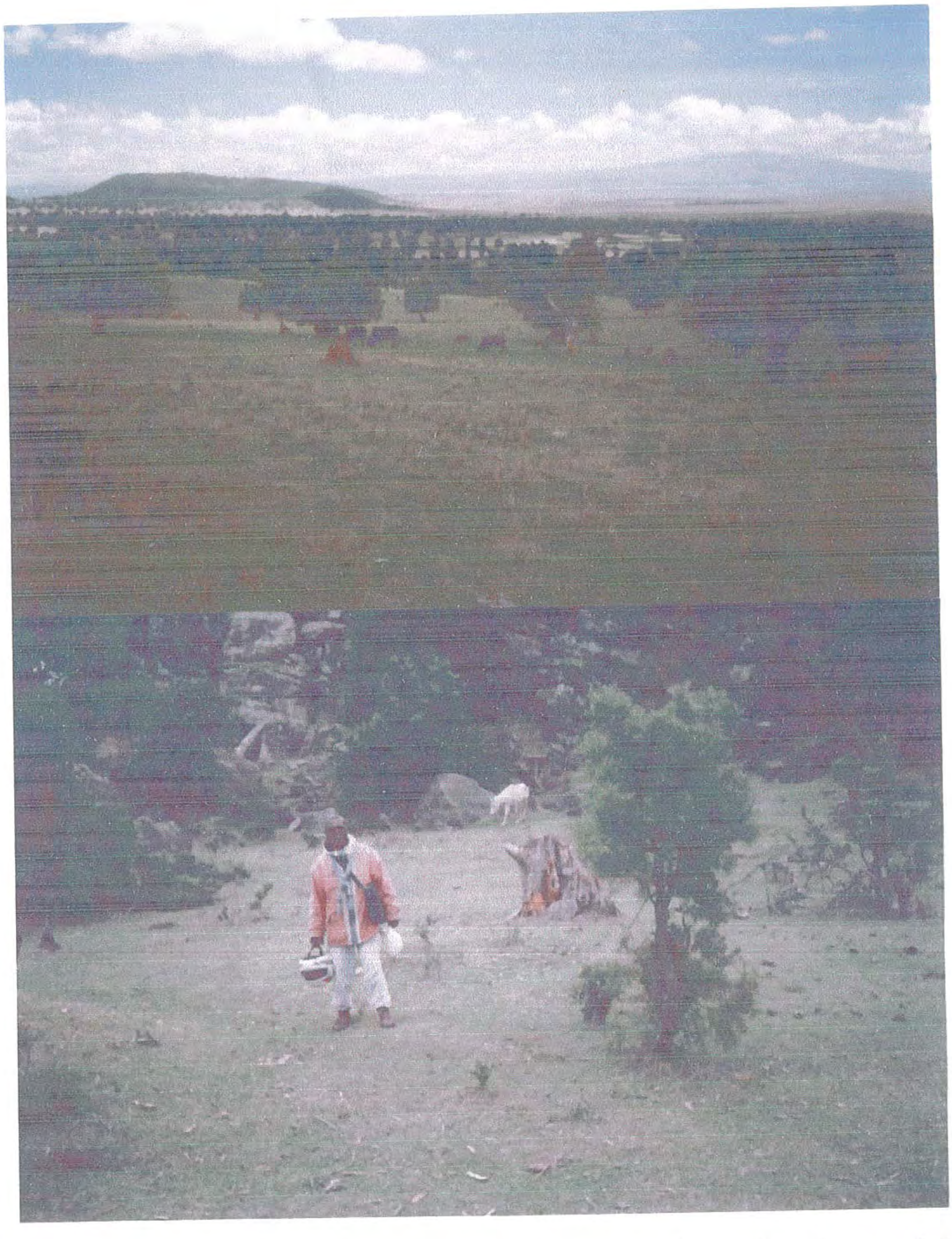
Region	Area (km^2)	Years	Total forest (%)
Oromia	359,758	1973-1976	8.6
		1986-1990	8.1
Southern	113,182	1973-1976	19.9
		1986-1990	11.6
Ghambella	25,538	1973-1976	0.3
		1986-1990	11.2

Source: JICA (1999:21) quoting Matthias Reusing, 1998.

Annex 6

Juniperus poraceria trees under competition in the study area.

Annex 6



Land use changing from forest to pasture and settlement and one of the forest administration expert s around the border of [illegible]

[illegible]

Annex 8

Improved forest condition (Podocarpus falcutus trees) under FDA managed areas around *Bura-Adele* village.