ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

NATURAL RESOURCE DEGRADATION AND THE PREDICAMENT OF RURAL WOMEN: THE CASE OF BUGNA *WEREDA*, NORTH WOLLO

HIRUT BEKELE

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Glossary

Arekie	A traditional alcohol drink
Bereha Meret	A land which is located relatively far away from a village and is relatively less fertile
Dagusa	A type of grain mostly found in Gojjam
Dega	Highland
Dem akoreth	refers to the inability of a land to grow crop when it is repeatedly ploughed
Digoma	Is a small piece of land given as a compensation to farmers who have relatively smaller land
Injera	A thin and flat local bread made of cereals
Kebele	The fourth administrative organization in Ethiopia
Keremt	Main rainy season in Ethiopia
Kik wet	A sauce made of split peas/beans
Kita	Thin local bread baked on metal plate
Kollo	Roasted cereal and pulses
Kolla	Lowland
Korefe	A local drink made of cereals
Mantese	A type of bush used for fuel
Maresha	a local digging material used for ploughing agricultural land
Mengistawi Buden	is the lowest " state administration group" which consists of 25-30 households and led by a person who is assigned by a *Kebele* administration
Mofer	A wooden tool which is used for ploughing with a pair of oxen
Sama	Type of plant which is also eaten as a cabbage
Shuro wet	A sauce made of peas or beans powder
Teff	A fine grain that is indigenous from which injera is made
Tela	A traditional local beer made of barely or sorghum
Timad	A plot a pair of oxen could plough in a day which is equivalent to 0.25 hectare
Weina dega	Mid higland
Wejed	A relatively small land that is located around residential area and is relatively fertile
Wereda	The third administrative organisation which is equivalent to a district
Ye egi mebzat	Increasing no. of hands or population pressure on natural resources

Abbreviation

ACW	African Center for Women
ANRS	Amhara National Regional State
CSA	Central Statistic Authority
DA	Development Agent
ECA	Economic Commission for Africa
EFAP	Ethiopian Forest Action Program
EJWST	Ethiopian Journal of Water and Science Technology
ENR	Ethiopian National Report
EPA	Environment Protection Authority
EPRDF	Ethiopian Peoples Revolutionary Democratic Front
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FHH	Female Headed Household
ILO	International Labour Organization
INSTRAW	International Research and Training Institute for the Advancement of Women
MHH	Male Headed Household
NCS	National Conservation Strategy
NGO	Non Government Organization
OAU	Organization of African Unity
ONCCP	Office of National Committee for Central Planning
RFHH	Respondents from Female Headed Household
RMHH	Respondents from Male Headed Household
SAERP	Sustainable Agriculture and Environmental Rehabilitation Program
SIDA	Swedish International Development Agency
SNV	The Netherlands Development Organization
SPSS	Statistical Program for Social Science
TGE	Transitional Government of Ethiopia
UN	United Nations
UNDP	United Nation Development Program
UNICEF	United Nations Children's Fund
WAO	Women's Affairs Office
WARDIS	*Wereda* Agriculture and Rural Development Integrated Service
WB	World Bank
WIBS	*Wereda* Integrated Basic Service
WHO	World Health Organization

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Abstract

This paper has attempted to examine the ongoing natural resource degradation and its implications on women in the rural Gelesot (lowland) and Telfetit (highland) Kebeles in Bugna Wereda, North Wollo. Bugna Wereda is characterised by natural resource degradation and recurrent drought.

The aim of the study was to find out the different implications that natural resource degradation has on women and their roles. By analysing the intra-household gender based natural resource utilisation, women's important link with their natural environment was reviewed. This has helped to analyse natural resource degradation and its negative implications on women and their roles. Moreover, the different responses and coping mechanisms that households employ during natural resource degradation were reviewed in relation to their implications to family welfare, contributions to natural resource management and further pressure on the existing natural resources.

The finding has disclosed that women have a day to day interaction with their natural environment since they play an important role in household food production, processing and food distribution. Moreover, it revealed that the degradation of natural resources in the study area has resulted in reduced supply of natural resources and has caused wider and complex implication on women, their families and their environment.

PART ONE

I. INTRODUCTION

1.1 Background

Natural resources degradation could be the outcome of both natural and man made process and in its turn it can also be the causes of different outcomes. The human interventions that affect our natural environment include the unwarranted removal of biomass for various purposes thus exposing the land to faster rate of degradation through natural process which could take in the form of soil erosion or loss of fertility. The expansion of agriculture on marginal land due to landlessness and land fragmentation together with inappropriate farming practiccs contributes to less productivity of soils (Rodda, 1991).

Water, land and forest are important resources that rural people use in their daily life. The degradation of these resources has serious impact on the livelihood of these people who depend on them.

Traditionally, in many developing countries females are responsible for the daily tasks of fuelwood gathering, fetching water, and food processing and preparation. Because of these roles and responsibilities which they are assigned through the gender divisionof labor[1] in their

[1] Gender division of labour refers to the socially arescribed roles and responsibilities of male and female both at household and community levels.

society, women have close contact with the natural environment (Dankleman and Davidson, 1989; Rodda, 1991).

With increasing natural resource degradation, females spend many hours everyday in fetching water and fuelwood. The depletion of woodlands and drying up of water sources translate into increased distance in search of new sources. Moreover, these routine and arduous tasks affect women's health and their time distribution among productive and child care activities, with a contribution to lower standard of living.

In response to the difficulties of getting a reasonable access to these resources, rural women employ different mechanism that may have different implications on themselves, their families and the communities as a whole.

Having the day to day link with their environment, women have acquired knowledge through time which are important in the process of natural resource management and their sustainable uses (Rodda, 1991). In some cases however, in the process of fulfilling their responsibility of cooking and food provision in their households, women are forced to contribute negatively to the already deteriorated environment.

Since the northern part of Ethiopia is one of the areas in the country which is seriously and repeatedly affected by natural resource degradation, the research has focused in one of this areas, Bugna Wereda, North Wollo.

1.2 Statement of the Problem

The household economy in many third world countries is almost entirely based on the biomass. Poor people in these rural areas, especially women, are very much dependent on natural resources to meet their basic needs. As a result, natural resource degradation has a big impact on the lives of women since they have little opportunity to make ends meet.

As stated earlier, rural women have closer link with their natural environment in relation to their roles of fetching water, collecting fuel and fodder and the tasks of producing and processing food. They rely on land, forests and water sources to produce food, fetch water, collect firewood, generate income, etc. (Dankelman and Davidson, 1989; Etalem and Fetenu, 1992; Reardon, 1993; Rodda, 1991).

The depletion of these resources as a result of the on going environmental degradation has a profound implication on the daily life of women and their families in the rural areas (Rodda, 1991).

When water sources dry up and polluted in their village, women and girls (to a lesser extent) have to travel relatively long distance and spend more time in fetching water. Since water fetching is preformed several times a day traveling longer distance becomes tiring and arduous for the water collectors. Moreover, the task has direct impact on the health of women and girls since it can absorb a quarter or a third of their daily caloric intake; and exposes them for contamination with polluted water as well (INSTRAW, 1989a; Rodda, 1991).

Although the importance of water quality for health is obvious, women who have less time for water collection may be obliged to fetch water from relatively lower quality sources located in relatively shorter distances. Furthermore, due to scarcity of water, a household may be forced to reduce the amount of water required per person with a negative impact on family nutrition and health (INSTRAW, 1989b; Rodda, 1991). This further increases household expenditure on health, for which women have to work longer hours to earn additional income and adds additional burden on women especially when household members are sick since they are responsible for nursing the sick (INSRAW, 1989a).

The depletion of forest resources means, women have to travel longer distances in search of new sources for fuel, medicine, income, food, fodder, etc. Different studies that focused on natural resource degradation have recognized the impact of deforestation on household fuel availability and women's increasing time spent in fuel gathering. Moreover, they indicated about the increasing use of animal dung and crop residue as fuel instead of as their original use to enrich soil fertility (Dankleman and Davidson, 1989; Duraiappah, 1998; Rodda, 1991; Shiberu, 1996; Sinkham, 1995).

With increasing scarcity of good quality fuel, traveling relatively longer distances as well as use inferior quality fuel such as dung and crop residues have different implications on women's health. Citing WHO, Dankelman and Daviden (1989) noted that the emission of smoke from biomass results in air pollution in the home while women cook. Shibru (1996) has also noted that such emission of smokes causes eye and respiratory problems particularly on women.

Shortage of fuelwood may also force households to change diets with a negative impact on the nutrition of household members, especially children and women, resulting in malnutrition (Bina, 1997; Dankelman and Davidson, 1989; FAO/SIDA, 1989; ILO (no date). Again women's responsibility of taking care of the weak and the sick will increase.

In addition to increasing women's workload and health implication, increasing time spent in fetching water and fuelwood negatively affects women's time distribution among productive and childcare activities consequently affecting the well-being of their households.

Cutting of trees, use of animal dung and agricultural residues for other purposes, erosion and other factors, affect agricultural productivity negatively. Reduction in agricultural productivity in turn results in low income or insufficient food in households. In order to fulfill household food requirement men and women have to work harder than before.

Land degradation affects agricultural productivity which is the backbone of the rural economy. When agricultural yield decreases and life becomes difficult in the rural areas, it is common for males to migrate to other areas in search of seasonal off-farm employment opportunity leaving their wives and their children behind (Bina, 1992; Rodda, 1991; UN/ECA, 1996; Yoneal, 1990). Then, women will be responsible for farming, childcare, household activities and even community affairs. In the event the men do not return to their villages and the number of female-headed households increases. This further implies that there will be labor scarcity for local resource management.

As Dessalegn (1996) noted, female headed households (FHHs) in the rural Ethiopia are one of the very vulnerable groups since often they hold small plot, marginal land, and lack labor and draught power. This implies that with increasing degradation of land, FHHs become more vulnerable to crises than male headed households (MHHs).

As has been explained by Yeraswork (1995) natural resource degradation directly affects the livelihood of the rural people in the developing countries by operating from two directions. He pointed out that resource degradation, on the one hand, results in reduced supply of energy for rural households with a consequence in reduced caloric intake and, on the other, the short supply of these resources require rural people to work harder than before and to expend additional energy. In line with this, it can be further argued that since the role of rural women (in food production, processing and supply) is directly linked with their natural environment, the degradation of these resources has wider and complex implications on them. As a result, the impoverishment of natural resources increases the predicament of rural women.

1.3 Objectives and the Research Questions

1.3.1 Objectives of the Study

a. General Objective

Owing to the serious problems and predicament that rural women encounter in household management in the face of resource degradation, the study will focus on and analyze the special implication that resource degradation has on women and women's roles; and their responses and coping mechanism on which they are forced to rely for the bare survival of their families.

b. Specific Objectives

The specific objectives that the research will address include:

- identify issues associated with environmental degradation;
- examine how environmental degradation affect women and their roles;
- assess seasonal availability/scarcity of water and fuelwood resources;
- understand the perception of women and men about resource scarcity and availability;
- assess the impact of resource scarcity on family nutrition and health;
- assess women's time spent on fetching water and fuelwood; and
- assess women's responses and coping mechanism in responding to environmental crisis

1.3.1 The Research Questions

The research in its attempt to address the above stated objectives will answer the following questions.

1. What natural resources do women use to perform their daily tasks in a household?
2. For what purpose do women use forest resources?

3. How and from where do women get these resources?
4. What are the evidences of increasing natural resource scarcity?
5. Does environmental degradation brought any change on the gender/age based division of labour?
6. Have men ever migrated in search of employment opportunities to other areas?
7. What is the perception of men and women regarding the availability/shortage of resources?
8. What are the underlying causes of resource degradation in the area?
9. Which natural resources are in short supply or degraded in the area?
10. What are the major problems of women that are associated with natural resource degradation?
11. How does natural resource degradation affect women and their roles in a household?
12. What are the impacts of natural degradation on household food security?
13. What are the perceived distances to water and fuelwood fetching?
14. In what way do women contribute to natural resource management?
15. How do women exert further degradation on the natural resources?
16. What are women's responses and coping mechanism?

1.4 Significance of the Study

In line with the growing concern about environmental degradation in Ethiopia, different studies on the subject, policy frameworks, institutions, different programs and projects emerged in the last two decades in order to understand and revert the situation.

However, although natural resource degradation is affecting rural women and their roles profoundly, most researches on natural resource degradation/management in Ethiopia (which are also cited in the next Chapter) appears to give little attention to these issue in depth to deal with them.

By assessing and analyzing the different impacts of natural resource degradation and the women's responses and coping mechanisms, this study will contribute to the scant information available on women and environment in the country. In addition, the finding will provoke ideas concerning women and environment and identify major issues for further research in Ethiopia.

1.5 The Research Methodology

1.5.1 Method of Data Collection

a. Secondary Data

In order to have background information about Bugna *Wereda* (related to the location, altitude, population, economy, etc.) relevant reports, studies and surveys conducted by NGOs (SNV and UNICEF), government (CSA) and individuals were reviewed.

The works of others on resource management and gender division of labor in other parts of the country were also reviewed. Some of the reports that were studied to understand natural resource utilization and degradation in Ethiopia include the report by Ethiopian Forest Action Plan (EFAP) in 1994 entitled the Challenge for Development, Environment Policy of Ethiopia (1997), the Conservation Strategy of Ethiopia (1997) and the Ethiopian National Report (1992), and the different Highland Reclamation Studies in the 80s. Research papers presented in

different Conferences such as Environment and Development (1990) and Population and Environment (1996) were also reviewed.

The study by Etalem and Fetenu (1992), Fekerte (1989) and UNDP/ECA (1997) have given the researcher some idea about the role of women and natural resource utilization and management in Ethiopia.

Since there is limited literature on women and the environment in Ethiopia, the different studies available about the third world women and the environment issues were assessed in the literature review. Most importantly, the works of Dankelman and Davidson (1989) and Rodda, (1991) provided the researcher a comprehensive picture about the third world women and their environment. In addition, the reports by international agencies include on Household Fuel Availability, Women's Work and Family Nutrition by ILO and FAO's three reports in the 80s which are focused on women, forest resources and food security were some of the basic reports that the researcher assessed.

Yeraswork's (1995) analysis concerning energy supply and demand in the face of environmental crisis, which recognizes the vicious circle of poverty and environmental crisis is central to the analysis of the research findings.

b. Primary Data Collection

i. **Survey Method**: a structured questionnaire was used to collect quantitative information such as time spent in collecting water and fuelwood, the number of trips to water sources, number of fuelwood sources, etc. from a sample of 80 households.

Most part of the questionnaire was pre coded (See Annex 1).

ii. **Qualitative/Field Research Method**:

In order to understand the perception of men and women about resource degradation and its impact on women and their roles as well as on the wellbeing of the community, extensive group discussions and in-depth individual interviews were carried out with women's group, elders, individuals, *Kebele* leaders and with the staff of *Wereda* Agriculture (including Development Agent's) and Health offices.

Moreover, together with elders (men and women), analysis of historical trends of natural resources availability was made through natural resource mapping exercise in some of the villages.

Observation of the natural environment, the day to day activities of women and men, visiting water sources, use of water and fuel resources also helped to note and feel the problems that women face.

In addition, intra-household gender division of labour and gender based natural resource utilization were analyzed.

1.5.2 Method of Data Analysis

Using SPSS (Statistical Package for Social Science), the quantitative data such as time spent, frequencies, etc, were computed. Agro-ecological zonation and types of households were the major area for cross tabulation of data.

A comparison was made between a highland and a lowland kebeles to look at the availability and types of resources, distances, time spent, frequencies, etc, and to understand the situation of women in the two agro-ecological zones. Another comparision was also made between female headed households and male headed households in order to understand how and in what way enviromental degradation affect the two types of households.

Special emphasis was put on qualitative analysis, which helped to understand the different implications of resource degradation on women, their families and the community as a whole; and to understand the perception of different people on the existing environmental problems.

1.5.3 Sampling Techniques

a. Site Selection Procedure

Bugna *Wereda* is divided into 33 rural and 2 urban *Kebeles* with different agro ecology (Map 2). As indicated in Table 1, to identify the site of the research a multi- stage sampling design was used. The sample sites were purposefully selected in three stages from the three levels (i.e. *Wereda, Kebele* and Sub-*Kebele*) of administrative organisation taking into account their agro-ecology and accessibility. First, out of 33 rural *Kebeles* in Bugna *Wereda*, two *Kebeles* namely Gelesot (lowland) and Telfetit (highland) were selected. Secondly, since both selected *Kebeles* were divided into 3 sub-*Kebeles*,

Sub-*Kebele* 1 from Gelesot and Sub-*Kebele* 2 from Telfetit *Kebeles* were selected respectively. At the third stage, two villages from Sub-*Kebele* 1 in Gelesot and three villages from Sub-*Kebele* 2 in Telfetit were selected. At this stage however, random sampling techniques were partially employed as a method of selecting the villages. After identifying 5-8 villages on the basis of their suitability/ from each of Sub-*Kebeles,* two villages from Gelesot (Babilana and Layignawmitk) and three from Telfetit (Angezba, Bugenj Amba and Garew) were picked by random method.

Table 1. Distribution of Respondents by *Kebele*

Bugna *Wereda*	***Kebele***	**Sub *Kebele***	**Village**	**Sampled Respondent**	**Total**
	Gelesot	Sub-*Kebele* 01	Babilana	20	
			Laygnaw Mitk	20	
				Sub-total 40	40
	Tefetit	Sub-*Kebele* 02	Angezba	20	
			Bugenge Amba	13	
			Garew	7	
				Sub-total 40	40
	2	2	5	80	80

As indicated in the above table, relatively large number of villages were selected from Telfetit *Kebele* due to the scattered settlement pattern of the population and the existence of relatively larger number of villages in the *Kebele* (21) as compared to Gelesot *Kebele* (9). In addition, the distribution of respondent within the three villages in Telfetit was done proportionally depending on the sizes of the households.

b. Sampling of the Respondent Household

After the selection of the sample villages, the sample of respondents were selected using stratified sampling design employing sex of household heads as the stratifying factor and systematic sampling as the method of selection.

The lists of the head of households from the selected sample villages were obtained from their respective *mengistawi buden* or "state administrative group". M*engistawi buden* is the lowest state organization led by a person who is assigned by the *Kebele* administration to represent and organize a group of 25-30 households in a village for various purposes such as campaign work, relief distribution, etc. After getting the lists of the households in each village, the list was dis-aggregated by sex of household heads leading to one list for female headed and another for male headed households in each village respectively.

The sampling intervals were obtained by dividing the total number of households by the sample size. It was calculated for the two types of head of households separately. Then having established the starting number at random, households were picked from the lists for inclusion into the sample beginning with starting number and following the sampling interval selected from the lists for inclusion into the sample.

Since the research aimed at investigating the implications of natural resource degradation on women and their roles, the quantitative aspect of the study has focused mainly on adult females. In line with this, as indicated in Table 2, out of 80 adult female respondents, 50% (40) are married women from the MHHs and the rest 50% (40) are female heads from FHHs.

Table 2. Distribution of the Respondents by the Type of Head of Household and *Kebele*

Kebele	Type of Household Head					
	MHH		FHH		Total	
	No.	%	No.	%	No.	%
Gelesot-018 (Lowland)	20	50	20	50	40	50
Telfetit-024 (Highland)	20	50	20	50	40	50
Total	40	100	40	100	80	100

Although the ratio of MHH to FHH is approximately 3:1 in both *Kebeles*, equal chances were given for both female headed and male headed households to be included in the sample. However, during the data analysis in the text in some instances disproportionate sampling system was taken into account.

1.6 Limitation of the Study and Problems Encountered

1.6.1 Limitation of the Study

- The study is mainly dealing with the utilization and degradation of natural resources with respect to land, forest and water resources.
- Decision making aspects on resource use and management were given little attention in the study since it would divert the researcher to other dimension of natural resource.

- It was not possible to measure distances and time spent accurately.
- The selection of highland and lowland is not strictly based on altitude but also cropping patterns, climate, tree varieties and peoples recognition, etc.

1.6.2 Problems Encountered

- Identification of respondent were difficult since many people were not in the area due to the drought.
- Women's time constraints to participate in group discussions. The research also shared part of women's time.
- The researcher has faced certain constrains such as time, transport, delays in the release of funds, financial shortage, etc.
- Travelling to the highland *Kebele* especially climbing mountain on foot was very difficult to the researcher.
- There was lack of adequate reading materials on women and environment in Ethiopia.

1.7 Organization of the Paper

The paper is divided into two main parts and seven chapters. Part one covers the first three chapters that give general information about the study and the study sites. The second part under its' four chapters presents the descriptive and the analysis of the research outcome. After this introductory chapter, which presents background, statement of the problem, objectives, significance of the study, research methodology, limitation of the study and problems

encountered, the second chapter reviews the literature on women and environment. Chapter 3 describes the study *Wereda* and the profile of the sample respondents household.

In part two, chapter 4 and 5 examine gender based natural resource utilization and analyze natural resource degradation and the predicament of women in the study area respectively. The different responses and coping mechanisms that women and their families employ during resource scarcity or degradation are presented in chapter 6.

Finally, chapter 7 presents summary analysis and conclusion.

II LITERATURE REVIEW

2.1 Women and the Environment: the Nexus

The earth provides basic natural resources such as land, forest, water and air which are necessary for life. The majority of the population in less developed countries live in rural areas and are highly dependent on these resources for their livelihood. These people grow their food and graze their animals on the land. They get food, construction wood, fuelwood, material for farm tools, medicine, income, fodder, etc, from the forest. And they use water resources for drinking, cooking, washing, tree growing, animal consumption, irrigation, etc.

Depending on their roles and responsibilities in their households, men and women in these rural areas use the mentioned resources for various purposes for the welfare of their family.

Rural women in Sub-Sahara Africa play a central role in household maintenance and sustenance, being responsible for food production and processing, cooking, fetching water, collecting fuelwood, etc. As a result, they have direct and important contact with their natural environment since they collect essential items from their surrounding environment. These daily responsibilities make women to have closer interaction with their natural environment (Reardon, 1993; Dankelman and Davidson, 1989; Rodda, 1991).

Rural women are also very much aware of their dependency on natural resources. Dankelman and Davidson cited Nyoni about what a woman in Zimbabwe has said in explaining the importance of the environment in her life.

"My environment is the basis of my economy and my total survival. It is from the land that I get my food"(Dankelman and Davidson 1989:18).

Although both men and women utilize natural resources for various purposes which concern their responsibilities, women's link with natural resource, especially open property resources is more pronounced. Open property resources often referred as "common property resource" such as water sources, forest and communal grazing refers to natural resource, which does not belong to and are not controlled by individuals or groups. Some reports indicate that, as compared to men, women in reural areas depend more on "common property" resources for survival of their families (WB/FDRE-WAO, 1998; Bina, 1997).

Although it is difficult to measure the extent of resource utilization by men and women to reach such a conclusion, I want to highlight two issues in justifying the statement that women depend more on their natural environment than men. First, women in the developing countries are more responsible for the daily household activities of fetching water and fuelwood, food processing, preparation, family health and nutrition (Etalem and Fetenue, 1992; Dankelman and Davidson, 1989). As a result, in order to accomplish the above daily tasks and in fulfilling household food security, women depend more on water and forest resources. Second, as compared to men, women in most traditional societies have little decision making power on household resources and benefits. Generally speaking, women's day to day activities and their little decision making power in households' make them more dependent on their surrounding resources.

The natural environment, however, when not controlled by few individuals or groups, provides women relatively better access. Bina, (1997) noted that the decline in these common property resources, however, has big impact on the roles of women and the condition of livelihood of their families.

2.1.1 Women and the Land

Cultivable and grazing land are the sources of food and income for many rural households. Men and women in the rural areas work on the land to grow food and cash crops and graze their animals.

Different studies about Sub-Saharan African agriculture show women's great contribution in the subsistence farming, growing 60-80 percent of the food in the region (Dankelman and Davidson, 1989; UN/ECA, 1996). Women in Africa do 30% of the ploughing, 50% of the planting, 50% of livestock related activities, 60% of the harvesting, 70% of weeding, 85% of the processing and storing, and 95% of the domestic wor (Rodda, 1991: 51, Citing ECA). On the other hand, citing the UN report, Davidson (1993) noted that, on the contrary to their greater contribution in food production, women own not more than one percent of the world's cultivable land.

A report by Blackden and Bhanu (1999) also indicates that in Sub-Sahara Africa, women's right to arable land is weaker than those of men' since the rights to land is strongly rooted in complex socio-economic, cultural and political structures. They further noted that with increasing scarcity of these resources, the right of individuals specially women is being eroded.

2.1.2 Women and Forest Resource

Women in the developing countries have close contact with forests since they are traditionally responsible for gathering of food, fodder, fuel, and other important items for their households from the forests. As indicated in Figure1, from the forest, women and their families collect food, fodder, construction and fuel wood, animal products, medicine, and raw materials for handicrafts and industries, etc.

Forest is a source of firewood which is used for various purposes i.e cooking, lighting and heating. Since the energy sector in Africa is not developed, 90% of the energy supply is derived mainly from biomass energy such as fuelwood, crop residue and animal dung (Dankelman and Davidson, 1989; UNECA/ACW, 1994). The situation is even worse in the rural Ethiopia and biomass covers 99.9% of the energy consumption, with fuel wood covering the biggest share 81.8 % followed by dung (9.4%), and crop residue (8.4%) with a small amount of charcoal (ENR, 1992: 16).

In most traditions including Ethiopia, collection of fuelwood for household energy supply is largely the role of women and girls (to a lesser extent). The time spent on travelling and collection in the forest depends on the quality as well as the availability of the resources. Men use forest resources for construction purposes, for farm implements and fodder.

Some poor women and men depend on collecting and selling of fuel wood for their livelihood. Especially in areas close to urban market, the collection and sell of fuelwood is a major source of income for these groups (FAO/UN, 1981; Fekerte, 1989; FAO/SIDA, 1989). A report by

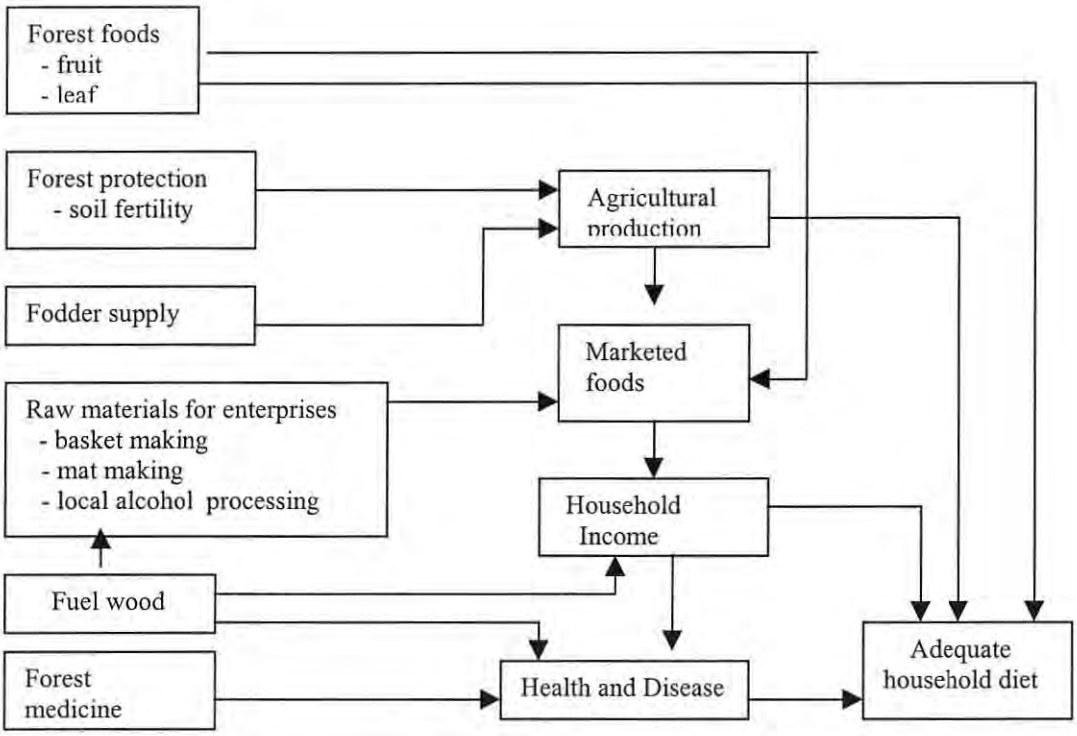
Rodda (1991) indicates that millions of women in India sell fuelwood (illegally) to ensure the survival of their households. Charcoal making and selling is generally males' work in many areas.

As a source of income, women's small-scale enterprises such as baskets, mats, pottery and local alcohol processing are highly dependent on natural resources (Aredayfio-schandorf, 1986; FAO/UN, 1989; UNDP/ECA,1997; FAO/SIDA, 1989). A study by UNDP/ECA (1997) in Afar region has identified that women are highly dependent on forest resources, especially on the palm leaves and sisal plant for house construction, household uses, and to generate income.

Some studies indicate that forests and farm trees contribute significantly to the food security of rural population, especially at times when other food sources are unavailable or during hunger periods. Women and also children collect this food from the forests to augment family food requirements (FAO/SIDA, 1989; UNDP/ECA, 1997; Etalem and Fetenu, 1992; Bina, 1997). Men do the hunting of animals while women collect a variety of food such as fruits, nuts, leaves, barks, roots, etc. (Rodda , 1991). A study in Afar Region in Ethiopia, has found out that women and girls collect wild fruits for household consumption and to some extent for sale (UNDP/ECA, 1997).

The importance of forest resources and women's role in household food security can be easily understood from the following Figure:

Figure 1: Link between Forest Resources and Women's Role in Household Food Security



Source: adopted from FAO/UN, 1989 (pp: 27)

2.1.3 Women and Water Resource

Water is needed in the rural areas for various purposes such as for drinking, cooking, personal hygiene and sanitation, for animal consumption, gardening, tree plantation and agricultural activities, etc,.

In the developing countries, women play a crucial role as providers and managers of water in a household. Traditionally, women and girls are most responsible for drawing, transporting, storing, distributing and using water for household purposes. In line with this, they have accumulated knowledge concerning location, reliability, restrictions and quality of water sources in their surrounding (Rodda, 1991; INSTRAW, 1989a).

2.2 Natural Resource Degradation and Women's Predicament

In many rural areas of the developing countries, land, forest and water resources are under serious threat of degradation (Duraiappah, 1998). These and other types of environmental crisis which endanger the life of human beings, species of plants and animals have been on the global agenda since the 1972 Stockholm Environment Conference. Women, being users, victims and managers of natural resources, the impacts of natural resource degradation on women is also getting world wide recognition these days.

It has become a common fact that the ongoing natural resource degradation (land, forest and water) is desperately affecting the majority of the rural poor whose livelihood is entirely dependent on these resources. As Yeraswork put it:

> *"For the rural people of developing countries, environment and natural resource degradation directly translates into to a worsening of their means of sustenance"* (1995:1).

It is very essential to raise and further discuss the two important arguments raised by Yeraswork in relation to energy supply-demand in the face of resource degradation. On one hand, he noted that the ongoing natural resource degradation reduces the supply of energy for the rural households resulting in reduced caloric intake. Because the effects of natural resource degradation result in low agricultural production, fewer per capita animal holding, shortage of fuelwood and water which means, the rural households will have less food or less income (Yeraswork, 1995:1).

On the other, in the face of resource depletion due to the need for working harder than before, there is an increasing demand for additional energy. In the process of compensating for the low level of

production, there is a need for expansion of additional energy which could be through adopting more labour intensive crop cultivation practices, participating in other income generating activities, traveling longer distances to fetch water and fuelwood, to graze animals, etc.

In the process of maintaining their family welfare, households may be further forced to utilize the natural resources around them in unsustainable manner putting additional pressure on the already degraded environment and exacerbating the problem (Sinkam, 1995; Rodda, 1991)).

Sinkam has noted that:

> *"The rural poor, the overwhelming majority of Africa's citizens destroy their own environment, not out of ignorance, but simply to survive"* (1995: 22).

He agrees that although this practice brings additional pressure on the already degraded environment, it is rational when it is seen from individuals short term basic necessities perspectives.

This poor people comprise 70-75% of the worlds' population, of whom women are the majority. Being dominant among the poor and responsible for household maintenance, women are at the forefront of those who are seriously affected when the land is degraded, forest depleted, and water sources dried up. The impoverishment of the environment could be translated into increased women's vulnerability to disaster (INSTRAW, 1993; UNE/CA/ACW, 1994; Davidson, 1993; Reardon, 1993).

When looking at a woman's responsibilities and position both in a household and in a society, the supply-demand - energy discussed earlier have big implication on their life. On the one hand, when there is less food in a household, that it is often women who are more affected since usually they give priorities to husbands and children during food distribution On the other, the growing environmental crises to women means, increasing distances to water and fuelwood sources and increasing workload. In such conditions, when women have little energy and they are expected to undertake activities that need more energy, their vulnerability to disaster will become more intense.

2.2.1 Land Degradation and the Impact on Women

Land degradation is one of the serious threats of agricultural growth in Africa. It is caused by man made and natural process and has a wide range of effects on the livelihood of the rural community whose economic base is agriculture.

A report by Sinkam has pointed out that the land degradation process in Africa affects 230 million hectares annually (1995:2).

The major human forces that causes land degradation are induced by high population pressure which include deforestation, overgrazing, poor farming practices and expansion of agricultural land in environmentally fragile areas (Alemneh, *et al*, 1997).

In addition, in a place where there is limited cultivable land and high population growth rate, the existing land is repeatedly cultivated without any fallowing. Such practice is exposing soils for water and air erosion and consequently resulting in reduction of agricultural yields. Moreover, the

expansion of crop cultivation and animal grazing on sloppy and marginal agricultural and grazing areas exposes land for further degradation through erosion (Sinkam, 1995).

The degradation of land in terms of scarcity or decline in the fertility of farm and grazing land results in a decline in agricultural yield and income, consequently leading to low level of living, unemployment, migration to urban areas, farming/grazing on marginal areas, etc. (Yoneal, 1990). The extent of the problem may induce the rural poor, especially men, to seasonally migrate to urban centers in search of employment opportunities. In some countries, the migration of male have led to the "feminization" of agriculture or marginal responsibility of men to the agricultural activities. Due to such and other social and economic factors, $1/5^{th}$ of the households is globally headed by women. In such cases, women are responsible for the overall agricultural activities and household maintenance (UN/ECA, 1996; Bina, 1992; Sontheimer, 1991; Rodda, 1991). Added with the need for more time for fetching water and fuelwood, women's living conditions will deteriorate as well as their families'.

Moreover, male out migration if it is for long time further undermines the agricultural development and resource conservation activities which is very crucial in the face of land degradation. And finally, all these trap the rural community in a vicious circle of poverty.

2.2.2 Depletion of Forest Resources and its Impact on Women

Forests are being removed for fuelwood, building materials, grazing, cropping, etc. Africa loses an estimate of 5 million hectares of tropical forest area per year (Sinkam, 1995:2).

As mentioned in the pervious section, forest provides women and their family with fuel, raw materials, food, medicine, income, etc. However, the ongoing deforestation practice has put pressure on the existing resources and desperately affected women. Women are being forced to walk longer distances to collect fuelwood, raw materials, and other necessary forest resources. In some cases, they are unable to find them at all. Deforestation is not only leading to a direct short supply or depletion of these resources for use but has a wider implication for the whole ecology in the long term.

Dankelman and Davidson (1989) have noted that because of fuelwood scarcity in some areas, women carry upto 35 kg of fuel wood at the back for a distance of over 10 km (1889:69). Since the firewood is collected in a difficult terrain, this arduous job is a back breaking and affects women's health and their child bearing. Moreover, the increasing time spent on this activity have negative effect on women's participation in productive (income generating) and child care activities.

In overcoming the existing fuel scarcity in the areas women employ different alternative mechanisms which are either at the expense of the environment or with proper resource management. In addition, some of the coping mechanism may have different repercussion on women's life and on the wellbeing of their families'.

The different coping mechanisms, which ILO (no date) identified are discussed as follows: -

a. Alternative Fuels

This include inferior quality (animal dung, agricultural residue) and commercial fuel (kerosene, electricity, etc). Due to the increasing scarcity of fuel wood, inferior or less quality fuel such as animal dung, crop residues, leaf and those fuelwood which are not often suitable for household fuel uses, are being widely used in many areas.

Use of animal dung and crop residue as fuels have different impacts on women and girls who are responsible for the collection and the cooking. Although these materials can be collected from a relatively small distances, they are inconvenient for cooking, required at larger quantities, require frequent feeding and tending the fire more carefully and have different impacts on their health (Dankelman and Davidson, 1989; Davidson, 1993).

b. Reduced Household Energy Consumption

Amount of fuel that a household consumes is being reduced in two ways. Some households reduce the number of cooking and change the type of food to cook. Others, reduces fuel uses through wise use of the fuel available in their households.

The first one may lead to changing in cooking habits, reducing number of meals per day, and changing in diet with adverse implication on family nutrition and health, especially on women and children (Dankelman and Davidson, 1989; FAO/SIDA, 1989; FAO/UN, 1989; Bina, 1997). Citing Bina, Dankleman and Davidson (1989) have noted that, in the Sahel and in Bangladesh a shift is noticed from serving two meals per day to one meal, due to a critical fuelwood scarcity.

To show the seriousness of the problem, some say it is what is under the pot (fuel) which is more worrying than what is in the pot (the food) (FAO, 1985). Another West African saying:-

"It costs as much to cook the rice as it does to fill the bowl" (FAO/SIDA, 1989:19).

c. Efficient Use of Fuel

Women also have different way of economising their fueluse. Tending fire more carefully, gradually feeding stick, converting clay pots with lids are the major once.

d. Further Pressure on Renewable Resources

The extent of the problem may induce rural women to cause more pressure on the existing living trees in the absence of dead branches. Moreover use of animal dung and agricultural residues, which have essential nutrient to increase land fertility may be used as fuel while exposing the land for further degradation.

2.2.3 Water Depletion and Impact on Women

Though water is one of the basic necessities in life, about two billion people in the world do not have access to potable water (EJWST, 1998). Water scarcity and pollution has become common problems in many areas.

Since women and girls are the sole collectors and providers of water in many households, they are being affected by water scarcity in terms of increased time spent, increased workload and affected health, etc. Citing New International Calendar, Rodda (1991) explained that, if water carrying is performed repeatedly and several times, it can distort the pelvis of young girls making pregnancy and child bearing more complex.

In some part of rural Africa, due to the drying up of water sources, women and girls have to travel a longer (6-8 km) distance with longer waiting time around the water sources (Dankelman and Davidson, 1989). Citing New International Calendar, Rodda (1991) also noted that women in many rural communities walk several hours carrying upto 20 kg of water every day. According to the same report, in some part of Africa, women spend 8 hours in water fetching which is an exhausting, time and energy consuming job (Rodda, 1991:51).

Women's time distribution between productive, childcare and other household activities will be also negatively affected, with a consequence on women's load and negatively affecting family welfare. A report by INSTRAW (1989a), revealed that the energy expended in water fetching is very high and may go upto a one-third of daily caloric intake.

Furthermore, the increasing distances to water sources may affect the education of girls if they are more involved in the work.

In coping with water scarcity, women may use unprotected sources and reduce the amount of water consumption of their families, with adverse effect on family health and nutrition.

Poor quality water exposes the water carriers and users to water born diseases. A report by INTSRAW (1989b) indicates that due to the intimate relationship between water and health, four-fifth of all disease in the developing world is water related. Especially women and girls

who have a regular contact with the unprotected or polluted water are more susceptible to water related diseases.

To conclude what has been said so far, natural resource degradation has direct impact on the daily arduous tasks of rural women. The efforts made by the rural women in responding to the immediate needs of household survival may impose further pressure on the already degraded resources, leading to a vicious cycle of rural poverty.

2.3 An Overview of Natural Degradation in Ethiopia

Ethiopia's renewable natural resources are central to its economy. The majority of the population i.e., 85% lives in the rural areas and they heavily rely on agriculture for survival.

It has become a common fact that the country's natural resources are deteriorating from time to time and the country is affected by recurrent droughts.

The most serious environmental problems in the country are the depletion of forest resources, soil erosion and loss of soil fertility, water resource degradation and loss of bio-diversity. (EFAP, 1994) Both human interventions and natural process cause these natural resources degradation. The high population growth rate and inappropriate extraction and use of resources are the major underlying causes that exacerbated the resource degradation in the country.

Having the majority of the population in the rural areas being dependent on natural resources for sustenance, the undergoing natural resource degradation in the country means deterioration

of the quality of life for theses people. In explaining the seriousness of the degradation process and poverty in the country, Sinkam noted that:

> *"No where is the lethal interaction of poverty and environmental degradation more evident than Ethiopia" (1995:20).*

Anover view of the major degradation problems in the country is briefly discussed as follow.

2.3.1 Deforestation

Forests play important role in the Ethiopian Economy. It provides food, fuel, fodder, timber for industry and house construction, natural gum, medicinal herbs, raw materials for handicrafts, etc. Moreover, forests play an important role in maintaining the environmental stability (Booth, 1985).

Different reports indicate that once high forests covered 35-40% of the Ethiopian land. The trend indicates that, in the early 1950s it was reduced to 16% , in the early 1980s it has fallen to 3.6% and in 1989 it is reduced to 2.7%. The annual deforestation of natural forest in the country is estimated to be 150,000-200,000 hectares (EFAP, 1994:21).

The widely recognized reasons for cutting trees in the country include for expansion of agricultural land for both crop production and animal grazing, fuel, timber, fodder, etc. Increasing demand for these resources arise with the increasing human and animal population. In addition, insecure land tenure policy, inappropriate farming system, absence of proper

resource conservation initiatives and natural process have contributed to the degradation process.

Apart from the effect of deforestation on the supply of forest resources, deforestation has wider implications for the socio economic conditions and the whole ecology. The major effects of deforestation is an overall environmental deterioration through erosion, deteriorating the water regime and micro climate, leading to further reduction in productivity and increased poverty leading to a vicious circle of deforestation and consequently to impoverishment.

2.3.2 Soil Erosion

Soil Erosion has become one of the serious environmental problems in the country that is caused by both human interventions and natural forces. It manifests itself though loss of soil nutrient or soil fertility.

Report indicate that, of the total agricultural land of the country which is 60 million hectare (120 days of growing period), almost 45% (27 million hectare) are significantly eroded, 23% (14million hectare) seriously eroded and 3% (2 million hectare) has reached the point of no return (Fikru, 1990).

Soil degradation is one of the major and immediate environmental problems facing Ethiopia. According to the report by Sinkam, 1,900m tones of soil is eroded annually from the highland causing 2-3% of yield reduction annually (1995:20).

The substantial extraction of vegetation cover, inappropriate land use practices, insecure land tenure policy, expansion of crop and grazing land on steep slops and ecologically precarious areas, and natural process are the driving forces behind land degradation in the country (EFAP, 1994). Population pressure again plays a critical role in the land degradation process since some of the factors are interrelated with increasing population. The terrain of the country, the climate and the erosive nature of the rainfall which are some of the natural factors, combined with other factors made the land vulnerable to soil erosion (Booth, 1985).

The increasing removal of dung and crop residue from the land in order to meet households fuel need instead of recycling into the soil has reduced soil nutrients. The Environmental Policy of Ethiopia indicates that the burning of dung as fuel instead of using it as a soil fertility, results in the reduction in grain production by some 550,000 tones annually (FDRE/EPA, 1997:1).

2.3.3 Water Resource Degradation

A report by EFAP (1994) pointed out that water resources in the country badly affected by sedimentation and siltation.

In Ethiopia, the coverage of access to sufficient and safe water is approximately 26% of the total population, the coverage for the rural and urban population is 20 % and 80 % respectively (Laketch, 1998:2). This coverage implies that the majority of the population in the country relies on sources that are unprotected and unsafe making them a risk to water borne diseases. A

study in a Pastoralists society in Afar indicates that women travel in dessert 2-6 hours to fetch water (UNDP/ECA, 1997).

III. DESCRIPTION OF THE STUDY AREA AND CHARACTERSTICS OF THE SAMPLE KEBELES

3.1 Description of Bugna *Wereda*

3.1.1 Location, Topography and Climate of Bugna *Wereda*

Bugna *Wereda* is found in North Wollo Zone in Amhara National Regional State (ANRS). It is bounded in the north by Wag Himra special zone of ANRS; in the west by South Gondar Zone, in the east and in the south by Gidan and Meket *Weredas* of North Wello respectively. Lalibela, which was founded by King Lalibela in the 12th Century is the administrative capital of the *Wereda* and is located 640 Km from Addis Ababa.

The *Wereda* covers an estimated area of 2000-2900km sq. 2.54% of the area is *Kolla* (below 1900masl), 76.7% *Weina Dega* (1900masl-2500masl), 19.36% *Dega* (2500), and 1.4% *Wurch* (above 4000masl) (Sayles, 1999). There are a total of 35 *Kebeles* in the *Wereda* of which 33 are rural and two *Kebeles* are urban *Kebele* (Lalibela).

The topography of the area is mountainous having steep slopes.

Most of the soils in the area are very shallow and susceptible to erosion. In some areas, where surface soils have been depleted the land is usually rocky (SNV, 1993).

The altitude ranges from 1500masl in the Tekeze valley and over 4000masl at mount Abune Yosef. The rainfall pattern is generally very erratic in the area. The average annual rainfall in the *Wereda* varies between 250mm to 1100mm.

The major rivers in the *Wereda* include Tekeze, ketchin Ababa,Simeno, Bilbala and Meri.

The land use pattern in the *Wereda* shows that 52.4% bushland (including grazing land) 35% wasteland, 10% cultivable land, 0.1% forestland and 2.3% other uses such as construction, etc. (Kruger and Solomon, 1994).

The natural vegetation in the area is very little except for few trees around settlement areas, churches and water sources. The area is characterized by extreme natural resource degradation such as soil erosion, deforestation and is repeatedly affected by drought, famine, disease out break, etc.

3.1.2 Population and Settlement Pattern

The 1994 census report indicated that the total inhabitant of the *Wereda* which is 171,333 people of which 50.6 % males and 49.4% females (CSA, 1994:10). A recent estimate (1999) computed by the Bugna *Wereda* Department of Agriculture indicates a total of 170,661 rural population of which 50.9% males and 49.1% females. According to this recent estimate, the rural population is approximately 95% and the rest 5% is the urban population. The overwhelming majority of the population (98%) are Orthodox Christians (Sayles, 1999).

3.1.3 The Economy

The vast majority of the population (95%) are subsistence farmers. Mixed farming system i.e. the combination of crop production and livestock husbandry is dominant

Agriculture is dependent on rain fed cultivation. The output from agriculture often hardly meet the demand for the consumption of the local communities. As a result, people in the area are highly dependent on relief food. The area faces repeated crop failure due to drought and unpredictable rainfall, pest damage, flood and serious land degradation.

The major crop grow in the area includes *teff* mainly with safflower inter cropping, barely, wheat, sorghum, field pea, horse bean, lentils and check peas. Agro ecological zones determine the cropping pattern. There are two rainy seasons in a year the short *belg* (Febraury-April) and the long *kiremet* (June-September) seasons. The highlands rely mostly on the *belg* rain.

Lalibela town and some *Kebeles* in the *Wereda* are historical attractive centers. Although not much, some people in the town benefit from tourism.

3.1.4 Land Tenure, Land Holding and Land Use Pattern

In 1989/90 there was land re-distribution in the area, which included women and youth above 18 years old. Latter on around 1994, land with given to displaced people and re-settlers. The average land holding in the *Wereda* is approximately 0.5 hectare per household. Depending on fertility, distance and legal distribution, lands are classified as *wejed*, *bereha meret* and *digoma*. *Wej*ed is relatively small land that is located around residential area and is relatively fertile. *Bereha meret* is relatively bigger in size which is located farm from the residential area and relatively less fertile. *Digoma* is a small piece of land given as compensation to framers who have relatively smaller land when compared to other and it is also located far from residential areas (Eskender, 1997).

3.1.5 Infrastructure Services

a. Health Service

Like in many areas in the country, health problems in the *Wereda* are related to the low level of socio-economic status of the population and the majority of the diseases are preventable. The leading causes of morbidity in the *Wereda* include malaria (27.81%), respiratory tract infection (10.76%) and Helementiasis (10.51%)(Sayles, 1999).

There is one rural Hospital, one health center, eight health stations and different health posts in the *Wereda*.

b. Education

The urban population is relatively literate as compared to the rural population. In the urban area 64% of males and 40% of females are literate whereas in the rural area the literacy rate is 6% for males and 1.2% for females (TGE/UNICEF, 1993).

There is one senior high school, 10 junior secondary schools and 14 elementary schools in the *Wereda*.

c. Water Supply Service

Rivers springs, and streams are the main sources of water for human and agriculture related uses. Water is one of the scarce resources in the *Wereda*. Only Lalibela town, i.e. an estimated population of 10,000, has piped water and few rural population benefits from protected springs. Most of the rural *Kebeles* uses unprotected water sources. In total only 23% of the *Wereda* populations access to potable water (Sayles, 1999: 16).

3.1.6 Communication, Light and Energy

Lalibela town has all weather road to Meket *Wereda*, Woldia and Sekota. Twenty two rural *Kebeles* are served by dry weather road and two *Kebeles* have no road at all.

The *Wereda* capital, Lalibela is served by semi- automatic telephone service, postal agents and 24 hours hydroelectric power. It is only one rural *Kebele* Ayna Eyesus that gets electricity for few hours in the nighttime using generator.

3.2 Characteristics of the Sampled *Kebeles*

3.2.1 Population Pattern in the Sampled *Kebeles*

As indicated in Table 3, both the household and population sizes are relatively higher in the lowland, i.e. 1847 and 7621 respectively as compared to the highland which is 1011 and 5424 respectively. However, the sex distribution pattern in both areas is similar in two important ways. First, approximately a quarter (25.9% in the lowland and 26.93% in the highland) of the households are headed by females in both the *Kebeles*; and second, the male population (51.23% in the lowland and 50.77% in the highland) slightly out number female population in both the *Kebeles* (See Table 3).

Table 3. Household Head and Population Distribution by Sex Composition in the Sampled *Kebeles*

Kebeles	Types of Head of Household					Population				
	Male		Female		Total	Male		Female		Total
	No.	%	No.	%	No.	No.	%	No.	%	No.
Gelesot (Lowland)	1368	74.1	479	25.9	1847	3905	51.2	3716	48.8	7621
Telfetit (Highland)	1011	74.1	354	26.9	1365	2754	50.8	2670	49.2	5424
Total	2379		833		3212	6659		6386		13045

Source: Sayles, 1999

3.2.2 Main Occupation of the Respondents' Household

Main occupation in this context refers to an activity that households undertake to earn their main income. In line with this context, respondents where asked about their main occupation. As shown in Table 4, 97.5% (39) of the respondents from male headed households (RMHHs) and 82.5% (33) of the respondents from female headed households (RFHHs) indicated that crop production is the main sources of livelihood in their households. One of the reasons for relatively high participation of MHHs in crop production as compared to FHHs is that even those MHHs who do not own land get involved in farming activities through renting others' or parents' land since they at least have male labour which is important for ploughing. On the contrary, as shown in the same table, the distribution of respondents whose main occupation is causal employment, *tela* and *arekie* selling, etc. is relatively high (17.5%) for the FHHs as compared to MHHs (2.5%).

Table 4. Distribution of Respondents by Type of Head of Household and Main Occupation

Main Occupation	Type of Head of Household			
	MHH		FHH	
	No.	%	No	%
Crop Production	39	97.5	33	82.5
Casual employment, *tela* and *arekie* selling, etc	1	2.5	7	17.5
Total	40	100	40	100

3.2.4 Land Holding

Respondents were asked whether their households own farmland or not, and 82.5% the respondents from female headed households (33) and 87.5 % of the respondents from the male headed households (35) replied yes. The rest 17.5 % respondents from female headed households (7) and 12.5% respondents from male headed households noted that their household do not own land.

Table 5. Distribution of Respondents by Type of Head of Household and Land Holding Status

Land Holding Status	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
YES	35	87.5	33	82.5
NO	5	12.5	7	17.5
Total	40	100	40	100

The information from the development agent in the study areas has revealed that the average land holding is between 0.5-0.75 hectares which is distributed more or less between the three types of cropland i.e. *wejed*, *bereha meret* and *digoma*.

3.2.5 Supplementary Income Activities

Supplementary income activity in this context refers to the activity that households consistently engaged in to earn additional income in order to make ends meet. Respondents were asked whether their household is involved in income generating activities to earn supplementary income. However, as indicated in Table 6, relatively few number of respondents (22.5%) from the male headed households and slightly lower than half (47.5%) from the female headed households noted that their households have supplementary income mainly from trading, daily casual employment or domestic employment and local drink processing (*tela* and *arekie*).

Respondents from FHHs have relatively high representation (47.5%) as compared to only 22.5% of the respondents from MHHs. On the other hand, when looking the types of activities, 40% of RFHHs and 12.5% RMHHs are involved in local drink processing. Local drink processing is carried out at home and is performed mainly by females in both types of households. 5% of the respondents from MHHs and 7.5% of the respondents from FHHs in both *Kebeles* earn supplementary income through casual labour including domestic employment and animal herding.

Table 6. Distribution of Respondents by Type of Household Head and Type of Supplementary Income

Type of Supplementary Income	Type of Head Household			
	MHH		FHH	
	No.	%	No.	%
Trading	2	5		
Casual employment	2	5	3	7.5
Local drink processing	5	12.5	16	40
Total	11	22.5	19	47.5

3.2.6 Livestock Ownership

Livestock husbandry is not mentioned as the main occupation in both *Kebeles*. However, the contribution of livestock was recognized in terms of its contribution to crop production (as a draught power) as well as a security during repeated drought and famine in the area. Moreover, animal dung plays an important contribution to household energy.

Difference is observed with regard to the number of livestock ownership between the lowland and the highland *Kebeles* as well as between male headed and female headed households.

Respondents were asked about the livestock holding status of their households. As shown in Table 7, in the lowland *Kebele*, 90% of the respondents from MHHs and 50% of the respondents from FHHs indicated that their households own some kind of livestock. In the highland *Kebele*, livestock ownership in the respondents' households is relatively lower for both types of households i.e. 75% of MHHs and 30% of FHHs. There is relatively high number of respondents who own livestock in the lowland *Kebele* as compared to the highland *Kebele*.

In addition, when comparing the two types of households, the majority (82%) of the respondents from MHHs owns livestock as compared to less than half (40%) of the respondents from FHHs.

Table 7. Distribution of Respondents by Lowland and Highland *Kebeles* , MHH and FHH and Livestock Holding Status

Livestock Holding Status	Lowland (Gelesot) *Kebele*				Highland (Telfetit) *Kebele*			
	MHH		FHH		MHH		FHH	
	No.	%	No.	%	No.	%	No.	%
YES*	18	90	10	50	15	75	6	30
NO	2	10	10	50	5	25	14	70
Total	20	100	20	100	20	100	20	100

Remark: * 82% of the MHHs and 40% of FHHs in both *Kebeles* own livestock

However, in the above analysis a household may own only a calf or a goat to be owner. To avoid such conclusion and to look at most important animals in the farming system, those respondents who own livestock were asked to indicate the number of ox/oxen as well.

As shown in Table 8, 90% of the respondents from MHHs in the lowland and 40% of the respondents from MHHs in the highland noted that their households own one or two ox/oxen. In the contrary, only 25% of the respondents from FHHs in the lowland and 10% of the respondents from FHHs in the highland indicated that their households own one or two ox/oxen. This shows that the majority of respondents from MHHs have own oxen as compared to the respondents from FHHs. The number of respondents who have ox/oxen in the two agro-ecology is also different in that relatively high number of respondents in the lowland own oxen as compared to the respondents in the highland.

This has big implication in the farming system of the two types of household and agro-ecology.

Table 8. Distribution of Respondent by Lowland and Highland *Kebeles* MHH and FHH and No. of Oxen Holding

No. of Oxen Holding	Lowland (Gelesot) *Kebele*				Highland (Telfetit) *Kebele*			
	MHH		FHH		MHH		FHH	
	No	%	No	%	No	%	No	%
One Ox	11	55	4	20	7	35	2	10
Two Oxen	7	35	1	5	1	5	-	-
Total	18	90	5	25	8	40	2	10

PART TWO

IV GENDER AND NATURAL RESOURCE UTILISATION IN THE STUDY AREA

The majority of the rural population, unlike the urban population, is highly and directly dependent on natural resources such as land, forest and water resources for their survival. Men and women utilize the natural resources in their surrounding in line with the task division and responsibilities in the household.

4.1 Land Resource

Farmland provides food for the rural households. The land re-istribution carried out in the study area in 1989/90 and 1992 (for re-settlers) have enabled both sexes to have distinct right on allotted farm plot. This does not however mean that men and women in a household have separate plots. In allotting the size of a plot to a household, the land redistribution had taken into account the different members of the household i.e. husband, wife and children and their family size. And it has guaranteed women's equal share in the family plot. This clearly implies that during divorce women have the right to take their share.

Possessing land, however, does not necessarily ensure receiving all the potential benefits. There are different factors, environmental, institutional, economic and demographic that influence land productivity.

As indicated in the previous chapter (Table 5), 82.5% of the respondents from female headed households (RFHHs) and 87.5 % of the respondents from male headed households (RMHHs) own land to earn a living.

Respondents were asked about the size of their farmland in terms of the local measurement i.e. *timad (*approximately a quarter of a hectare*)*. As shown in Table 9, 3% of the MHHs own 1 t*imad* as compared to 36% FHHs. Almost half (54%) of MHHs and 58% of the FHHs have 2-3 *timad* of farmland. 40% of the MHHs own 4-5 *timad* as compared to 6% of FHHs. Only one MHHs household (3%) own over 5 *timad* of land. The land size of MHHs is relatively larger. This is partly because, when the land is distributed both the husband and the wife in a household got equal share which made their share double of the female headed households.

Table 9. Distribution of Respondents by Type of Head of Household and Category of Plot Size

Category Plot Size	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
0 *timad*	4	20	4	20
1 *timad*	-	-	1	5
2-3 *timad*	4	20	14	70
4-5 *timad*	11	55	1	5
>5 *timad*	1	5	-	-
Total	20	100	20	100

The information from the development agent in the study areas has revealed that the average land holding is between 0.5-0.75 hectare. These landholdings are classified into three types of cropland i.e., '*wejed*', '*bereha meret*' and '*digoma*'.

Respondents were asked to indicate the involvement of their household members in agricultural work. 92.5% of the respondents from the MHHs noted that their husbands are involved in agricultural activities. Concerning the participation of females, 80% of the respondent women in MHHs are involved in agricultural work as compared to 33% of the women in the FHHs. Respondents from FHHs less participate as compared to women from MHHS, this is partly because more than half (58%) of the respondents from FHHs rentout their plot to male farmers on share cropping basis (See Table 10).

Table 10. Distribution of Respondents by Type of Head of Household and Household Member Involvement in Farming

Household Member Involvement in Farming	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
Husband	4	10	-	-
Husband and wife	32	80	-	-
Husband and son	1	2.5	-	-
Female heads and son	-	-	1	3
Son	-	-	3	9
Female heads and relatives	-	-	10	30
Land rent out to other farmers	2	5	19	58
Total	49	100	33	100

There is a clear gender based division of labour in crop farming and in some cases it is not flexible. Adult males solely perform ploughing, sowing and threshing while women in such activities assist their husbands. For example, women cover the seed with soil when the men saw, they prepare the threshing field, etc. Both men and women participate in activities such as weeding, harvesting, collecting, transporting and storing grain, etc.

4.2 Forest Resource

Men and women in the study areas utilize forest resources for various purposes such as house construction, fencing, farm tools, fuel, animal feed, medicine, etc. The activities here are also based on the gender division of tasks.

In the following sections, use of forest resources by men and women is briefly discussed.

4.2.1 Construction Materials and Farm Tools

In both the lowland and the highland *Kebeles*, house construction and maintenance as well as fencing are the major responsibilities of adult male. As a result, men are responsible for selecting and collecting appropriate wood and grass from the forest for house construction and fencing. During house construction, adult females also participate in activities such as fetching water and mud or dung plastering activities. House construction or fencing however are not frequent activities, they are carried out like once in a year.

Being responsible for crop production and management of land and livestock resources, men solely undertake the ploughing and are responsible for grazing of animals especially during the dry seasons. Selected tree species from the forest are used by men to make farm implements,

such as *mofer, kenber,* and *maresha,* etc. As noted by a farmer in Telfetit, in the past, farmers keep 3-5 reserves of these tools, which are used at the different stages of farming.

4.2.2 Animal Feed

Respondents were asked to indicate the sources of animal feed for their households. Crop residue, weed plant, fodder plant, and grasses in the forest are identified as the major sources.

As indicated in Table 11, crop residue is the main source (100%) of animal feed in both *Kebeles*. Weed plant is the other important source of animal feed especially during the crop cultivation seasons for 94% of households in the lowland *Kebele* and for 100% of households in the highland *Kebele.* 55% of the lowland and 30% of the highland households use fodder plant for animal feed. 20% of the lowland and 60% of the highland households graze their animals on communal grazing land. In the highland, communal grazing was observed within the village, while there was none in the lowland *Kebele.* Because of the absence of grazing land in the villages, households in the lowland graze their animals in the forest and also collect fodder from the forest.

Table 11. Proportional Distribution of Respondents by Lowland and Highland *Kebeles* and Type of Animal Feed

Type of Animal Feed	Lowland *Kebele*		Highland *Kebele*	
	Proportion	%	Proportion	%
Crop residue	32	100	25	100
Weeding plant	30	94	25	100
Fodder plant	17.5	55	7.5	30
Communal grazing	6.5	20	15	60

Respondents of the two type of households were also asked about the involvement of different household members in collection of animal feed. According to their response, the majority (60%) of RMHHs noted husbands collect animal feed. 20% of the RMHHs noted that both husband and wife collect animal feed. Moreover, 7% of the respondents from the same type of household noted that wives are involved in fodder collection while 13% noted boys involvement. The majority (88%) of RFHHs indicated that female heads are responsible for fodder collection while 13% said boys (Table 12).

As indicated in Table 12, the participation of females in fodder collection varies in the two types of households. More females in FHHs participate in fodder collection as compared to females (wives) in MHHs. This is partly due to the husbands' involvement, wives have less responsibility in fodder collection.

Table 12. Distribution of Respondents by Type of Household and Involvement in the Collection of Animal Feed

Involvement in the Collection of Animal Feed	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
Husband	9	60	-	-
Husband and wife	3	20	-	-
Wife	1	7	-	-
Sons	2	13	1	13
Female head	-	-	7	88
Total	15	100	8	100

4.2.3 Fuelwood

The main use of forest resource by women is for household energy consumption, since women are responsible for food preparation. In addition, fuel is also used for heating, especially in the highland, and to some extent for lighting. Moreover, those women who are engaged in local alcohol processing for income generation require fuel in a large quantity for processing as well as distillation purposes. As indicated in the previous chapter, as a supplementary source of income, 40% of the respondents in the female headed households and 12.5% from male headed households are involved in *tela* and *arekei* processing.

Analysis of the intra-household division of labour regarding fuelwood gathering shows that both men and women including their children of both sexes participate.

However, the extent of the involvement of men and women differ depending on fuelwood availability and fuel type. Respondents were asked to tell the main fuel wood collectors in their households. As shown in Table 13, the respondents in the MHHs in the lowland *Kebele* noted that the husbands and the wives almost equally participate in fuelwood gathering, while in the highland *Kebele*, more (40%) wives are involved as compared to only 5% husbands. As explained by the elders in the lowland *Kebele*, in the past fuelwood collection was mainly the tasks of women and children since dry fuel was available in the nearby. With the increasing scarcity of fuelwood, it became difficult to find dry wood in short distance and the source of fuelwood for this *Kebele* is located in Tekeze valley. Since the forest is located in the valley and the dry wood is no more available, men stared to join women to help them in cutting as

well as carrying the wood. No difference was observed in the respondents of FHHs concerning women's share in fuelwood gathering which is 65% in both *Kebeles* (Table 13).

Table 13. Distribution of Respondents by Lowland and Highland *Kebeles*, MHH and FHH and Division of Labour in Fuel Wood Collection

Division of Labour in Fuelwood Collection	Lowland *Kebele*				Highland *Kebele*			
	MHH		FHH		MHH		FHH	
	No	%	No	%	No	%	No	%
Husband	4	20	-		1	5	-	-
Wife	4	20	-	-	8	40	-	-
Husband and Wife	5	25	-	-	1	5	-	-
Sons	1	5	2	10	2	10	2	10
Daughters	1	5	1	5	4	20	3	15
Husband and Son	1	5	-	-	-	-	-	-
Wife and son	-	-	-	-	2	10	-	-
Sons and Daughters	1	5	1	5	2	10	-	-
Husband, wife and son	1	5	-	-	-	-	-	-
Husband, wife, and children	1	5	-	-	-	-	-	-
Female head	-	-	13	65	-	-	13	65
Female head and sons	-	-	1	5	-	-	-	-
Others	-	-	2	10	-	-	2	10
Total	20	100	20	100	20	100	20	100

On other hand, the other type of fuel i.e. dung is mainly collected by females. The forest is also to some extent source of medicinal plants in both *Kebeles*.

4.3 Water Resource

The main source of water in both *Kebeles* is spring followed by rivers. Women are the main water carriers and providers to most households. This task is again very much associated with

the role of women in food preparation and serving, cleaning and washing, and local beverage processing.

Women collect water for various purposes other than cooking and drinking. In those male headed and female headed households, who are involved in local drink processing, women require relatively large amount of water. In addition, women as primary health takers, use water for washing clothes and household utensils. It is also used for tree growing, especially in the highland *Kebele* and animal use (mainly calf).

Respondents were asked to tell who is doing water fetching in their households. 82.5% of the respondents from the MHHs (married women) are the major water collector followed by the combination of women and girls (12.5%), women and boys (2.5%) and girls (2.5%). 84.4% of respondents from the FHHs (female heads) are the major water collectors followed by girls (7.3%) and others (7.3%) (See Table 14).

Table 14. Distribution of Respondents by Type of Head of Household and Division of Task in Water Fetching

Division of Task in Water Fetching	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
Wife	33	82.5		-
Female Head	-	-	35	85.4
Woman and Girl	5	12.5	-	-
Woman and Boy	1	2.5	-	-
Girl	1	2.5	3	7.3
Women & Girls	-	-	3	7.3
Total	40	100	41	100

V ANALYSIS OF RESOURCES DEGRADATION AND THE PREDICAMENT OF RURAL WOMEN IN THE STUDY AREAS

5.1 Analysis of Resource Degradation

Land, forest and water resources are the major resources that were under serious degradation in the study areas. This was investigated through the number of group discussions and in-depth interview carried out with different groups of men and women, elders and Development Agents in both *Kebeles*. Discussion was also held with an Agricultural Expert from the Bugna *Wereda* Department of Agriculture. Moreover, the researcher also observed and recorded the state of the natural environment.

In examining the degradation process, availability of some resources were discussed with elders. To begin with forest resources, informants identified the different types of species of plants and animals available in the past. In the highland *Kebele*, trees/bushes such as *weira* (Olea europaea), *tid* (Juniperus procera), *grar* (Acacia albida), *kitkita (*Dodonaea anguistifolia*)* that used to be available in plenty have now disappeared except for few species to be found around church compounds (Telfetit Mariam). Some eucalyptus trees around homestead and *mentese* (type of bush) and *Ambaci* (Aeschynomene elephroxylon) bushes in the mountain areas have replaced them.

In the lowland, trees and bushes such as ts*edo* (rhamuns staddo) , *chakema (rhus natalensis), jeba* (ziziphus spina-christi), inkoy (Ximenia americana), *dokma* (Syzygium schimperil), which were used for various purposes are no more available easily. *Jeba (ziziphus* spina-christi) tree is

found on farmlands in Babilana villages and, *kinchip* (Euphorbia trucalli) that is planted as a fence around homestead is very common. *Dedeho* (Euclea schimperi) bush is the major vegetation cover in the mountainous areas. Some tree species are also observed around Hawa Michael Church.

Informants in both *Kebele*s have also mentioned that there were a variety of wild animals in the past which were used as food but currently they have disappeared from the areas due to deforestation.

Both men and women farmers have identified a number of factors, which have contributed to the degradation (depletion) of forest resources.

5.1.1 Population Pressure

According to the informants, increasing population pressure is the major cause for depletion of forest resources. When explaining this they noted that there is *ye egi mebzat* which literally means "increasing hands", against the forest for farmland (food), construction, farm tools, fuel, etc.

In the highland, since the area was undulating and there was shortage of farmland, mountainous areas were cleared, burned and cultivated. While conducting a meeting with men and women informants around Telfetit Mariam Church, an old man aged 78 pointed his finger at the degraded mountain in front of us and said that once the mountain was covered by *weira (*Olea europaea), *tid* (Juniperus procera),and *kitkita (*Dodonaea anguistifolia*)* etc. He noted that later

on it was deforested and cultivated. Finally, he added that during the *Derg* regime, farmers were prohibited from cultivating that mountain and it was left aside. The mountain still is not covered with any tree, except for few bushes. When asking a young man who was born and lived in the same area for the last 30 years, whether he remembers the trees and bushes on the same mountain, he replied no.

5.1.2 Land re-distribution

Some informants noted that in the past farmers (landlords) had cultivable lands in different agro-ecology zones. But after the land re-distribution carried out in the area, farmers' ownership is limited to their *Kebeles*. This has caused farmers to cultivate forest and mountain areas within their *Kebeles* illegally.

5.1.3 Ignorance

Farmers also identified the low level of understanding about sustainable use of resources as one of the factors that contributed to the fast rate of forest depletion. They noted that they never thought that the resources could disappear like this. As a result, they were not selective while cutting trees and there was little tree plantation practices undertaken.

5.1.4 Drought

Farmers have stressed that due to the 1974 and the 1984 drought in the area, many trees died. The ruminant trees could not regenerate after these droughts.

5.2 Land Degradation

Land degradation, mainly losses of soil fertility and land fragmentation are the major problems that were identified during group discussions. Men and women farmers in both *Kebeles* have identified the following as the major causes of land degradation in the study areas.

a. **Deforestation:-** has caused loss of vegetation cover. Especially, the clearance of mountainous areas has exposed farmlands for water and soil erosion.
b. **Sheet erosion:-** Heavy shower rain washed up the repeatedly ploughed soil.
c. **Absence of fallowing practices:-** As a result of farmland sacristy, farmers repeatedly plough and cultivate their plot. The informants said the land is *dem akorete* to imply the "the land is tired or dead".
d. **Removal of crop residues and animal dung from land:-** Farmers have explained that in the past, there were abundant fuel-wood and animal fodder therefore the cow-dung and crop residues were not used for fuel or animal feed. While grazing the residues on the farmlands, animals used to drop their dung. Then the crop residues and animal dung mixed and used to "thicken" the land. With the existing fuel and grazing scarcity, every thing is removed from the land exacerbating the loss of soil infertility process.

e. **Changing cropping patterns:-** This has also contributed to some extent to soil infertility. Farmers have noted that since crop farming has become mainly for household consumption, most farmers grow only staple grains mainly teff, sorghum, wheat and barley. The production of legume plants such as field peas, horse bean, chickpeas is no more common. The contribution of such crops for enriching soil nutrients should not be overlooked.

The land degradation was revealed through loss of soil fertility and a consequent decline in agricultural yield. In both *Kebele*s, fertile soils were getting washed away by water and wind erosion. Respondents were asked whether farmlands in their households were affected by soil erosion or not. As shown in Table 15, in the lowland *Kebele*, 65% of RMHHs and 80% of RFHHs replied yes, while only 25% of RMHHs said no, and 10% of RMHH and 20% of RFHHs responded can not say. In the highland *Kebele,* relatively large number of respondents' i.e. 95% of RMHHs and 70% of RFHHs responded yes and 25% of RFHHs replied no and 5% from RMHHs and 15% RFHHs can not say.

When looking at the two types of agro-ecology, relatively large number (96%) of respondents in the highland responded that their households have soil erosion problem as compared to 86% in the low land.. On the other, when looking at the farmland in the two types of households, 82% of RMHHs and 91% of RFHHs, whose occupation was agriculture have noted that they have soil erosion problem (see Table 15. and the remark).

Table 15. Distribution of Respondent by Lowland and Highland *Kebeles*, MHH and FHH and Recognition of Soil Erosion Problem

Recognition of SoilErosion Problem	Lowland (Gelesot)				Highland (Telfetit)			
	MHH		FHH		MHH		FHH	
	No.	%	No.	%	No.	%	No.	%
Soil Erosion Problem exist*	13	65	16	80	19	95	14	70
Soil Erosion Problem doesn't exist	5	25	-	-	-	-	3	15
Can't Say	2	10	4	20	1	5	3	15
Total	20	100	20	100	20	100	20	100

Remarks *** In total 82% RMHHs and 91% RFHH recognize soil erosion problem.**

*** In total 86% Proportion of Households in the Lowland and 96% Proportion of Households in the Highland recognize soil erosion problem in their areas.**

Land degradation causes reduction in crop yield from year to year and some times the land becomes even unable to grow crop. Repeatedly, informants stressed that their farmland is *dem akoreth* to mean the land is "tired" or "died" because the fertile soil that enables crop to grow is eroded.

5.2.1 Female Headship and Land Degradation

The division of labour in a household that is often culturally determined assign different tasks for females and males based on gender. The farming system, like many other areas in the northern part of the country, is oxen plough dominated where by male labour play a crucial role in tilling the land. An adult male is responsible for management of farmland in a household while an adult female, although have important contributions to the farming, is often responsible for the household activities..

Among other required inputs for crop cultivation, adult male labour and an ox, are very crucial for land ploughing. Not all households in the study areas have both of these, and some may not even have either of them at all. However, those households who have at least male labour who can do ploughing can exchange with another farmer who own an ox/oxen.

As mentioned in the previous chapter, 82.5% RFHHs have farmland and agriculture is their main occupation. When looking at oxen ownership between the two types of households, relatively more (65%) RMHHs noted that their households own one or two oxen as compared to only 17.5% of RFHH. Due to the absence of adult male labour and/or lack of ox, 58% of RFHHs rent out their land to other farmers on crop sharing basis. In addition to ox ownership in RMHH, the availability of male labour has made land renting as little as 5% in this type of household.

The type, quality and distance of a particular farmland often influence crop-sharing arrangement between a landowner and the other farmer who rented the land. For *wejed* land, which is located around residential area and relatively fertile, the landowner will get 1/3 of the yield. On the other hand, if the land is degraded and is far away from the village which is often the *bereha meret*, the landowner gets only a quarter of the produce.

Beyond getting only one-third or a quarter of the produce from their land due to the quality and distance of their land, those female headed households who rentout their land have noted that they are disadvantaged in many respects. First, those farmers who took their land on a rent basis often undertake agricultural activities of such arrangement untimely, contributing to

reduction in crop yield. Second, there are also less conservation activities carried out on such lands. This is because the farmers for whom the land is rented do not usually want to invest time and energy to conserve the land since such arrangement is on short-term bases and the farmer may not have long-term security to work on it. As a result, the land of female headed is exposed to more degradation as compared to the land of male headed households. The more their land is degraded, the more their share from crop production reduces and their living condition deteriorates.

5.2.2. Land and Labour in a Vicious Circle of Degradation

Among other things, cultivable and grazing lands of good quantity and quality are the bases for development of agriculture and consequently the rural economy. However, the depletion of these resources in quality as well as in quantity means less food and income and low level of living standard for the rural population.

According the result of the discussion with informants in both *Kebeles* and the outcome of the survey, agricultural production is reducing from time to time in the area. Let alone to produce surplus that could be stored away to accumulate for hard times such as drought years, agricultural production in the study areas is hardly enough for household consumption. The problems even become more serious, when there is environmental crisis. The food shortage problem has intensified seasonal labour migration to other agricultural potential areas and to towns in search of employment opportunities. Seasonal out migration is the last but important option that rural household undertake during such crisis.

More often the migration periods are during agricultural off-seasons between September and December and between May and June. However, the migrants may also stay for 6 months to 1 year in the place of destination leaving their families and agricultural work behind.

The pattern of migration in the study area indicates the migration of families (households) and individuals from both sex groups. An effort has been made to list down migrants in some villages in both *Kebele*s. In Babilana village in Gelesot, four male headed households with 30 people in their households including the husbands, wives, children and other dependants, two households (men and women) being divorced, five orphans (2 girls and 3 boys) and six youths (two females and 4 males) have left the village in search of other economic opportunity. In Laygnaw mitk village in the same *Kebele*, seven male headed households with a family member of 34 (including the head, wife and children and other dependants), five household who are divorced with family size of six persons and two youths have migrated to other areas. From the male headed households, one household left the woman and another the woman and seven children behind. The majority of the migrants from this *Kebele* go to the bordering *Wereda* Meket, Setitu Humera, Welega (previous settlement area), Ray and Laibela.

In Angezeba village in Telfetit *Kebele*, a total of 17 households (9 female headed and 8 male headed) with a family of 80 have gone to Lalibela (12 households), Raya (3) and Welega (1 household). The majority of the female-headed households (9) are migrant in Lalibela. Like in the other *Kebeles*, only males could migrate leaving their wives and children behind.

In the lowland *Kebele,* it is only males who migrate to Setit Humera to harvest cotton and *selit* being employed as daily labourer. Men do not take their families with them to this place since the area is malaria prone. Those male and female migrants in Lalibela become either fuelwood carrier or/and daily labourers. Migrants in Raya are often employed as agricultural labourers on daily contractual bases especially during harvesting. In addition, both men and women work as daily labourer in construction sites or in households.

Farmers in Telfetit have noted that migration in the area has become reduced this year due to the different employment generating development activities such as school, clinic and road construction activities implemented by Plan International Ethiopia.

Although the migration pattern shows that the majority of migrants go with their families (wives and children), informants have noted that when problems are relatively better only males migrate living their families behind. In addition, in some areas, it is difficult to travel with children and mothers.

Case Study 1

> *Ato Habtamu Demesie from Angezeba Kebele noted that he left five members of his household including his wife in the village and went to Raya during the rainy season since they have no seed that could be sown. Since he did not get enough income, he was only eating a piece of bread every day to survive. He sent his wife only twice, 10 birr each. He said, while I am away it is my family who was more affected since they had nothing to eat except relief food.*

Case Study 2

Ato Birara aged 45 told that he was migrant in 1998 to Setitu Humera. He is married with three children. The eldest is a female 14 years old and who already got divorced. When his household couldn't harvest enough for the survival of its members, the couple decided that Ato Birara should migrate to Setitu Humera in search of seasonal employment. The wife and the children staying in the village were getting some support from government relief program. Part of the family plot was rentedout to another farmer, on an arrangement that the owner gets 1/3 of the yield and some was cultivated with the help of his relative. In Setitu Humera Ato Birara was employed on daily basis but did not send any money for his family. The reason was absence of a faithful person who could take the money to his wife. Finally, Ato Birrara came back home after a year with some money and was able to pay his wife's loans and buy cloths and other important things for the household. The man said, the money was not enough to rehabilitate my household to a better level. He also remembers a family who went to Raya and came back with no improvement in their life.

Population pressure was mentioned before as one of the major causes of natural resource degradation, since it has promoted cutting trees, cultivating steep slopes, absence of fallowing, etc., with the objective of increasing production for the increased population. On the contrary, in the faces of resource degradation, when land conservation activities could play an important solution, withdrawals of labour from the already degraded environment has exacerbated the process of land degradation.

Since the land has reached to a point of no return to its original quality only through the natural process, it requires different inputs and/or conservation activities by humans to be carried out. This implies the need to have more labour that could work on soil conservation activities. It is this labour (adult male labour) which is being degraded in the area intensifying the problem of degradation.

Although there exists period selective migration whereby men plough and saw before they leave their villages, the labour need at the destination sometimes is very much associated with peak agricultural seasons as well. For example in September there is weeding and starting December there is harvesting. In such cases, if her husband is out, a woman is burdened with weeding and harvesting if the land is not rented out. In addition, female informants have noted that when the men are not around to watch wild animals, crops get eaten.

Land degradation and the resulting migration affects women in many ways. On the one hand, when men migrate after cultivating the family plot, women will be burdened with the other farming activities, household responsibility, community affairs and by engaging in income generating activities. Apart from the agricultural activities, women in the highland noted that male out migration especially during the rainy season hinders house maintenance activities putting family members in poor shelter exposing them to rains and cold.

On the other hand, when women migrate with their families, it is often hard to women to adjust with new communities as compared to men. The activities that is undertaken by female migrants in Lalibela is often fuel gathering and employment in household activities.

5.3 Fuel Scarcity and the Impact on Women and their Families

5.3.1 Analysis of Historical Trends in Fuel Availability

This finding and analysis is the outcome of a number of group discussions with elders (both men and women), women's group, survey and individual in-depth interviews. In addition, in

order to make people remember the past, village natural resource mapping was done in some villages.

The historical analysis of fuel availability pursue the forest resource availability trend, since the major sources of fuel in the past were mainly trees and bushes.

When explaining the extent of fuel scarcity in their areas, informants have identified changing fuel sources and varieties, sharing the task of fuel gathering by men and changing time spent as the major indicators.

5.3.2 Fuel Sources and Altering Fuel type

The major sources of fuel in the past in both areas were trees and bushes from the nearby forest. *Tsedo* (rhamuns staddo) was the major types of trees used for fuel in the lowland *Kebele* while *grar* (Acacia albida), *weira* (Olea europaea),*tid* (Juniperus procera), and *kitikita* (Dodonaea anguistifolia) in the highland. According to both men and women informants, animal dung was little used as fuel in the past because of the availability of quality fuel in short distances. In addition, since the smell of the dung was bad, the dung in the household was only used for baking bread used for brewing local drinks.

Respondents were asked to indicate the primary and secondary sources of fuel in their households. The survey has revealed the existence of some differences between the highland and the lowland *Kebele*s with regard to primary source of fuel. As shown in Table 16, in the lowland, the primary fuel source is animal dung for proportion of 76% households, followed by

bushes 21% and trees 3% respectively. In the highland however, the primary source is bush 39% followed by dung 34% and tree 28% respectively. The share of tree is relatively high (28%) in the highland as compared to the lowland which is only 3%. This is mainly explained in relation to the existence of eucalyptus tree plantation activities and its use for fuel in the highland.

Table 16. Proportional Distribution of Household by Lowland and Highland *Kebele* and Primary Fuel Source.

Primary Fuel Source	Lowland *Kebele*		Highland *Kebele*		Total	
	Proportion	%	Proportion	%	Proportion	%
Trees	1	3	11	28	12	15
Bushes	8.5	21	15.5	39	24	30
Animal Dung	30.5	76	13.5	34	44	55
Crop Residues	-		-			
Not identified	-		-		-	
Total	40	100	40	100	80	100

Since there are different fuel sources that a household uses, respondents were asked to indicate their secondary fuel sources as well. The finding shows that in the lowland *Kebele* as secondary fuel source, 66% of the households use bushes followed by animal dung 19%, trees 11% and agricultural residues 3%. In the highland, the proportion of households using animal dung is 56% followed by bushes 23% and trees 19%. In each area, 5% of the household do not use any secondary fuel source (Table, 17).

Table 17. Proportional Distribution of Household by Lowland and Highland *Kebele* and Secondary Fuel Source

Secondary Fuel Source	Lowland *Kebele*		Highland *Kebele*		Total	
	Proportion	%	Proportion	%	Proportion	%
Trees	3	11	7.5	19	10.5	13
Bushes	26.5	66	9	23	35.5	44
Animal Dung	7.5	19	22.5	56	30	38
Crop Residues	1	3	-	0	1	1
Not identified	2	5	2	3	4	4
Total	40	100	40	100	80	100

The varieties of trees and bushes that were used in the past in the study areas were changed with the losses of tree species. Currently bushes such as *dedeho* and *gumero* in the lowland; and *mentese* (a type of bush) and *Ambaci (Aeschynomene elephroxylon)* in the highland are commonly used bush species. Eucalyptus tree is planted at the backyards of many households in the highland *Kebele* and its is the main tree variety that is currently used for fuel in the area. Women use its' bark, wood and leaves for fuel. On the other hand, the plantation that is common, as a fence in the lowland is *Kinchib* (Euphorbia traclli) and it is also used as fuel. Furthermore, in the lowland, the leaf of sisal plant is used as fuel when the problem is serious.

The inferior or poor quality fuels that women identified in the lowland include *kinchib* (Euphorbia traclli), sisal plant, animal dung and *gumer* (Capparis fomentosa). While in the highland eucalyptus lea and animal dung. The use of different inferior quality fuel has different implication on the health of females who are responsible for the daily cooking. When the fuel

has poor burning quality, it is required in relatively larger quantity and causes smoke that negatively affects health and test of food.

The information from head of Bugna *Wereda* health office has revealed that respiratory tract infection and eye disease which are common in the *Wereda* are partly caused by inferior quality fuel that women use. He further noted that most women aged 40 have eye problems which could be due to the poor quality fuel.

5.3.3 Frequencies and Time Spent in Fuel Collection

The frequency of fuel wood collection is determined by the type of fuel to be collected, family size, distances, frequencies of feasts and the existence of income generating activities which require more fuel.

The collection of animal dung is done more frequently than wood as shown in Table 18 below. As shown in the same table, fuel is more frequently collected in the highland *Kebele* as compared to the lowland. This could be due to the need for more energy in the highland for heating, the availability of wood in a relatively shorter distances, and the relatively small livestock holding that make women to collect animal dung from outside their home more frequently.

Table 18. Proportional Distribution of Household by Lowland and Highland *Kebeles*, Type of Fuel Source and Frequency of Fuel Collection

Frequency of Fuel Collection	Lowland *Kebele*			Highland *Kebele*		
	Type of Fuel Source			Type of Fuel Source		
	Fuelwood	Animal dung	All Fuel Source	Fuelwood	Animal dung	All Fuel Source
	Proportion	Proportion	Proportion	Proportion	Proportion	Proportion
Once per week	49	10	1	41	14	1
Two-Three times / week	21	38	25	46	10	6
Four-Five times / week	-	23	1	1	5	-
Every day	-	-	-	-	51	10
Total	70	71	27	88	80	17

Respondents were asked about the average time spent per day in fuel gathering. When looking at the different types of head of households in Table 19, the time spent in fetching fuel is relatively high (90%) in the houses of male headed as compared to 78% in the houses of female headed. This could be justified by the existence of relatively larger family size in the houses of male headed.

Table 19. Distribution of Respondent by Type of Head of Household and Time Spent in Fuel Gathering

Time Spent in Fuel Gathering	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
One hour	2	5	5	13
Two hours	2	5	2	5
Three hours	-		1	3
Four hours	36	90	31	78
Can't Say			1	3
Total	40	100	40	100

A comparison was also made between the lowland and the highland *Kebeles* with respect to time spent in fuel collection. As shown in Table 20, more (92.5%) households in the lowland travel some four hours to fetch fuelwood as compared to 84% of households in the highland. The difference between the two *Kebele*s is due to the existence of tree plantation and its contribution for fuel and the availability of bushes in the nearby areas in the highland *Kebele*. People in Gelesot (lowland) *Kebele*, collect fuelwood from Tekeze valley travelling difficult location. However during the group discussion in Telfetit (highland) *Kebele*, farmers have noted that in the other village within the *Kebele*, men and women travel to places in the neighboring administrative zone (Wag Himra) and spend 12 hours for round trip fuel collection.

Table 20. Proportional Distribution of Household by Lowland and Highland *Kebeles* and Time Spent in Fuel Gathering

Time Spent in Fuel Gathering	Lowland *Kebele*		Highland *Kebele*	
	Proportion	%	Proportion	%
One hour	1	2.5	2.5	6
Two hours	2	5.0	3	8
Three hours	-	-	0.5	1
Four hours	37	92.5	33.5	84
Can't Say	-	0.0	0.5	1
Total	40	100	40	100

5.4 Water Source Location, Scarcity and Quality Effect on Women and Family Health

5.4.1 Implications of Water Availability on the Water Carriers

Water source location, scarcity and quality have various implications on women, and their families' health.

Water source availability as well as its location has direct impact on women who are the household water carriers and providers. Perennial water is not available in every village and a number of villages often share common water sources. In the lowland *Kebele*, 5 neighboring villages (Babilana, Laygnawmitk, Tachegnawmitk, Mekakelegnawmitk and Ketef) with a total household size of approximately 370 share one water source (spring) located in Babilana with an average distance of 30-45 minutes round trip.

In the highland *Kebele*, 5 neighboring villages (Angezeba, Bugenj Amba, Awerаribado, Garew and Ketchenmesk) use Awerаribado spring. The source is located in Awerаribado village that is central to the other four villages. The average distance to this source is similar to that of the lowland, 30-45 minutes. The direction of the previous water spring that was located in the same village was diverted due to the creation of a gorge in the center of the village. As a result, the previous water source has dried up.

In the lowland *Kebele*, the human intervention on the use of water source has affected the water availability. Informants have noted that in the past land around the water source was only used for animal grazing. Currently however, the area is being ploughed and used for plantation of

pepper and onion. On the one hand, when the land is ploughed and exposed to sun it loses its moisture. On the other, the water source itself is increasingly used for plantation competing with human and animal uses. As a result, water is becoming one of the scarce resources in the area.

Respondents were asked about the average number of times that they fetch water per day for household consumption. As indicated in Table 21, in normal circumstances 50%-55% of the respondents' households collect water twice per day having different family size (often more than two).

Fetching water is an activity that is undertaken every day except for the Sabbath days and some religious celebrations. Women do not fetch water on Saturday and Sunday and as a result, every Friday and Monday they are required to fetch more water. If they face serious water shortage during these days, they do fetch but can only keep the water out of the house due to the same religious reason. Moreover, when there is feast and income-generating activities like brewing local drinks for sell, washing and watering of trees and small animals, women increase the amount of water they fetch.

Table 21. Distribution of Respondent By Lowland and Highland *Kebeles* and MHH and FHH by Frequency of Water Collection

Frequency of Water Collection	Lowland *Kebele*				Highland *Kebele*			
	MHH		FHH		MHH		FHH	
	No.	%	No.	%	No.	%	No.	%
Once a day	3	15	7	35	5	25	4	20
Two times/day	11	55	10	50	11	55	11	55
Three times/day	4	20	3	15	3	15	3	15
Four times/day	2	10		0	1	5	2	10
Total	20	100	20	100	20	100	20	100

Case Study 3

Endalguagua Setegn lives in Angezeba village. She is the head of her household living with 3 other family members. Like women of her villages, she fetches water from Awereribado spring most of the days except for Sabbath. Since she sells korefe, a type of local drink, she often requires water in relatively larger quantity.

This meeting was held in Friday around 6:30 pm and Endalguagua has already collected 6 pots of water. She said she would go once more. Her pot contains 18 tin of marmalade, which is equivalent to 18 liter. She said that through the weekend she will use the water economically and Monday early in the morning she fetches water several times. For Endalguagua, fetching water is more though during Sabbath and when she prepares drinks for sell.

Water availability is also influenced by seasons. In relation to the big rainy season, *keremt*, water is available in sufficient quantity in many areas especially in the high land since seasonal streams also flow. However, in such cases, availability does not imply easy access to water sources as well as the existence of good quality water. Women and men in the highland *Kebele* have noted that since the water source that serves the five villages is located on the side of a gorge, the water that women fetch during the rainy season is more of dirt and floodwater. As a result, women collect surface water which is not also of a good quality.

In addition, due to the dangerous location of the spring in Telfetit *Kebele*, while collecting water women can easily fall. Both men and women have noted that a number of women fell and got their pots broken due to the mud during the rainy season. During my research, I have crossed the gorge to visit the spring and felt tired walking steep slop and climbing even empty handed. I have observed fetching water every day from that spring could be difficult, risky and tiring.

I have also observed very slow flow of water in springs. The water fills up into the well very slowly and women wait till the source fills up. As a result, waiting time at springs increases for women. According to women informants in both *Kebele*s, the waiting time at the water point could go up to 2 hours depending on the timing of fetching water as well as on the flow of water.

Water shortage starts during the months of December, January, May and mid June. If it rains *belg* season water is available during February to April. However, since for the last three years there was no *belg* rain, the amount of water in the springs has reduced.

The suitable water fetching hours for women are between 7 am-10 am in the morning and 3 pm-5 pm in the afternoon. However, due to the increasing number of people using the same source and the limited flow of water from the source, women have to go as early as 5 am. Women in the lowland *Kebele* have noted that when they go early in the morning to fetch water, they catch cold as well as malaria easily.

During the dry season, women in both *Kebele*s, go to the relatively farther sources carrying 12-18 litters of water at their back. During such period, women in the highland *Kebele* fetch water from Ketchin Mesk River, travelling some 45 minutes (one way). Although the distance to this water source relatively seems small, women have to climb a mountain in a difficult path carrying water. Even without carrying anything, I noticed that in my travel to the study area for this research climbing the mountain is very tough. When the amount of spring water decreases, women in the lowland *Kebele* fetch water from different rivers (Washka, Shallo and Areb Sheh) the distance ranges between 1-2 hours for walk round trip.

To summarize, water fetching in the study area is a demanding and tiring job for women who are mostly responsible for fetching. First it involves carrying heavy load i.e. 12-20 liters of water. Second it is done several times per day. Third it involves travelling on average 30 minutes in the normal season and 1-2 hours during water scarcity time. Fourth, it involves waiting time at the spring or going to the source very early in the morning. And finally, fetching water is done from difficult location especially in the highland, which is very risky.

5.4.2 Implications of Water Scarcity and Quality on Family Welfare

The quality of water as well as the quantity that a household consumes has direct impact on the health of its members. Moreover, the time that women spend on water collection has varies implications on their time distribution among other family welfare activities.

The water sources that are currently used by both *Kebeles* are exposed to animals, dust and inappropriate use by human beings. Assistant Nurse in the Gelesot clinic has noted that water scarcity and its poor quality has exposed many households for water born diseases. He noted that human beings and animals share the same source and of the major health problems in the area, Diarrhea and Malaria are water related.

The amount of water collected and consumed in a household depends on the distance to the source, women's time availability, family size (to a lesser extent), the existence of income-generating activities, religious celebration, etc.

Women also noted that when they spend more hours on fetching water, their contribution to other activities is limited. They mentioned that small children who are left at home keep uncared when they spend more hours in fetching water.

For those women who are involved in supplementary income activities, water is one of the major raw materials used. The local drink processing requires large amount of water or it could be said that the activity is more of "selling water". As a result, water scarcity directly affects income-generating activities of women that are undertaken to supplement household food requirement.

VI. HOUSEHOLD RESPONSES AND COPING MECHANISMS DURING ENVIRONMENTAL CRISIS

The different environmental crisis, that has been discussed so far, has constrained many households to sustain household food security. However, these rural communities muddle through the problem and partially have managed to maintain the survival of their households. The activities that are being undertaken however, have different implications on women, their families and the natural environment.

In this section, household responses and coping mechanisms as a way to family welfare, and its contribution to resource management and degradation will be discussed in brief.

6.1 Responses and Coping Mechanisms: a Strategy to Family Survival

6.1.1 Reduction of Agricultural Yield

Land degradation and the repeated drought in the study area have become beyond the capability of the rural households. Since the livelihood of the majority of the rural households is very much attached to agriculture, when the land is unable to provide enough food and grazing, their members become food insecure. The informants in both *Kebeles* have marked that there is reduction of agricultural yield and deterioration of their living standard from year to year.

Interviewees and informants have identified seven coping mechanisms that households rely upon to address partially food insecurity of their households. The mechanisms include, saving grain, seasonal labour migration, daily labour, income generating activities, selling animals, borrowing and relief food.

Saving and economising grain produced is the first strategy that is often undertake by women in a household. This saving is often mean reduction of food consumption in terms of quality as well as quality. However, saving enables household to have some food for some longer period, which would not have been possible if it was not saved or consumed within few months.

Farmers in the study areas have noted that the amount of food that they consume decreased very much. During food shortage, women are more affected since they often consider themselves at last after serving the husband and the children. In such cases, when saving is pronounced, it will be at the expense of the women.

In addition, changing in food type is observed in the highland *Kebele*. Informants during the group discussion in this *Kebele* have explained that new grain *dagusa* is introduced in the area recently. Local traders bring this grain from Gojam with relatively lower price than major staple grains. Women have complained that grinding this grain is more tough and laborious. In addition, the quality of the *injera* is poor.

Women in the highland *Kebeles* have also noted that a weed plant called *sama* is eaten during food shortage.

As indicated in Table 22, most of the respondents' households i.e. 80% of MHHs and 45% of FHHs in the lowland and 75% of MHHs and 60% of FHHs rely on relief food for survival. Daily labour which is mainly related to food for work is important means of income for the majority of the respondents households i.e. to 80% MHHs and to 65% of FHHs) in the

highland. While in the lowland, it is limited to 25% of RMHHs' and 40% of RFHHs. The difference between the highland and the lowland *Kebeles* is mainly due to the implementation of rural road and other construction programs by a non government organization called Plan International in the highland *Kebele* which employed daily laborers.

Respondents also noted that they sell their livestock when food shortage becomes very serious in their households. As shown in Table 22, 25% of the respondents from MHHs and 15% respondent from FHHs in the lowland *Kebele*; and 40% of respondents from MHHs and 30% from FHHs noted that their households sell livestock to purchase food. Reduction of the number of animals is attributed to such cases as well as animal death due to drought.

The common income generating activities in the area is brewing of local drinks. Although the figure indicated in Table 22 in both *Kebels* is relatively small and makes the contribution of the activity less relevant, the activity is already been adapted in a way that it becomes a permanent supplementary activity. As supplementary activity, local drink processing gives livelihood opportunity for some households, especially for female headed households as discussed in Chapter 3.

Seasonal labour migration is the other common practices during food shortage in both *Kebele*s by both RMHHs and RFHHs. The figure indicated in the table below is relatively small since most people have already migrated and were not included in the survey.

Table 22 Distribution of Respondents by Lowland and Highland *Kebeles*, MHH and FHH and Type of Response During Food Shortage

Type of Response During Food Shortage	Gelesot (Lowland) *Kebele*				Telfetit (Highland) *Kebele*			
	MHH		FHH		MHH		FHH	
	No.	%	No.	%	No.	%	No.	%
Borrowing	3	15	3	15	8	40	6	30
Employment as casual worker	5	25	8	40	16	80	13	65
Migration	5	25	1	5			4	20
Relief Food	16	80	9	45	15	75	12	60
Selling Animals	5	25	3	15	8	40	6	30
Local drink Selling	3	15	6	30	7	35	3	15
Total	20	100	20	100	20	100	20	100

6.1.2 Fuel Scarcity

The critical fuelwood crisis in the two *Kebeles* has forced households to switch to use of other fuel types. Moreover, different households practice efficient use of fuel resources, tree planting initiatives and exert pressure on the existing remnants of trees and bushes.

a. Changing to Other Fuel Type

As has been discussed in the previous chapters, different selected fuel wood varieties were used for fuel in the study areas. Fuel quality is measured in terms of flammability, good smell, absence or little smoke, burning for long, dryness, etc.

The unsustainable removal of trees which resulted to depletion of vegetation cover in terms of quantity as well as quality pushed the rural households to divert to other fuel types which hardly fulfil the above mentioned qualities.

Animal dung is one of the most common and inferior quality fuels, which is used by many households in both the lowland and the highland *Kebeles*. In the past, its' use was very limited to roasting grain and baking bread for local drink brewing. This days however, its' use has gone far to heating in the highland *Kebele*. The other inferior quality fuel identified by households includes *kinchip* (Euphorbia trucalli) and *gumero* (Capparis fomentosa) in the lowland, and *mentese* (a type of bush) and *Ambaci* (Aeschynomene elephroxylon) bushes and eucalyptus leaf in the highland.

Generally speaking, these types of fuels refereed as inferior quality fuels since they are required in relatively large quantity for cooking, have poor burning, smoky, need frequent feeding and tending fire more carefully, etc.

b. Reduce Energy Use

Informants have been asked whether they have reduced the amount of energy they use as a result of fuel shortage. As shown in Table 23, 91% of households in the lowland and 88% in the highland *Kebeles* indicated that they reduce their energy consumption during fuel scarcity.

Table 23. Proportional Distribution of Respondents by Lowland and Highland *Kebeles* and Energy Use

Energy use	Lowland *Kebele*		Highland *Kebele*	
	Proportion		Proportion	
	No.	%	No.	%
Reduce Energy use	36.5	91.25	35	88
No reduction in Energy use	3.0	7.5	5	12
No Response	0.5	1.25	-	-
Total	40	100	40	100

Being aware of the existing problem, the majority of the households in both *Kebele*s reduce their energy uses. In the past, since fuel was abundant while not cooking or with no purposes, fire was often keep burning on the stove. Currently, this is changed to starting fire on purpose or for cooking.

Those respondents who reduced their energy consumption during fuel shortage were asked to tell the mechanisms. As indicated in Table 23, through tending fire more carefully 97% of households in the lowland and 100% of households in the highland; and using metal utensils (plate or dish) 49% of households in the lowland and 66% of households in the highland, efficient use of fuel resource is observed. Some households use metal dishes and plates for cooking, roasting and baking with the objective of reducing energy use, among other things such as being urbanized.

When there is serious fuel shortage, women also change the types of food they have to prepare. Food like *kollo* (roasted grain), *kita* (thin bread) and *shuro wet* (sauce made of peas and beans

powder) require less fuel as compared with the staple food *injera* baking and *kik wet* (sauce made of split peas). Through changing to a food type which require less fuel 84% of households in the lowland and 86% of households in the highland, responds to the fuel shortages. There are also households who reduces the frequencies of cooking i.e. 84% the households in the lowland and 94% in the highland reduce their energy uses (see Table 24).

Table 24 Proportional Distribution of Respondents by Lowland and Highland *Kebeles* and Way of Reducing Energy Use

Way of Reducing Energy Use	Lowland *Kebele*		Highland *Kebele*	
	Proportion		Proportion	
	No.	%	No.	%
• Changing to a food type that require less cooking	30.5	84	30.0	86
• Decreased meals to be cooked	30.5	84	33.0	94
• Tending fire more carefully	35.5	97	35.0	100
• Use of metal dish or plate for cooking or baking	18.0	49	23.0	66

Although not quantified, most households use kerosene for lighting since it is cheaper than burning other fuel.

c. Water Scarcity

Women as water carriers and providers, always have to make sure that there is enough water in their households. When there is water shortage, they employ different coping mechanisms. More "efficient" use of water and washing of clothes at the water points are very common mechanisms. When the problem is pronounced, they travel farther to other sources.

Table 25. Proportional Distribution of Respondents by Lowland and Highland *Kebeles* and Responses/Coping Mechanism During Water Shortage

Responses/Coping Mechanisms During Water Scarcity	Lowland *Kebele*		Highland *Kebele*	
	Proportion		Proportion	
	No.	%	No.	%
Travel long distance	18.5	46.2	32.0	80
Efficient use of water	12.0	30	3.5	8.7
Reduce cooking	1.5	3.7	-	-

6.2 Implications of Coping Mechanisms to Resource Degradation and Management

The mechanisms that households employ, when coping with environmental crisis, may contribute positively to natural resource management or exert pressure on the already degraded environment.

6.2.1 Land degradation

a. Shortage of Land

Due to land scarcity, households have no more land to keep fallow. In addition, they continue cultivating only staple food crops such as *teff*, sorghum, barely and wheat reducing the cultivation of legume plants such as horse bean field beans, etc. In such situation, the farmlands become unable to maintain soil fertility. In addition, due to land shortages farmers continue cultivating their lands repeatedly with no fallowing.

b. Competition between Resource Uses

Competition between use of resources is the other factor that causes further degradation on resources. Use of animal dung as fuel and use of crop residue as animal feed impacts soil fertility. An old man in Telfetit in explaining the contribution of these resources to soil fertility noted that:

> *"In the past, animals used to graze after harvest karmia (left over after harvest) on farmland. While grazing, they drop their dung on the land and the dung then mix with the crop residue on the land making the land thicker. These days however, animal dung and crop residues are being used for other purposes and there is nothing left on the land."*

Animal dung has almost replaced wood as a major fuel source through time together with deforestation practices. First, in the past those households who have animal dung collect the dung and prepare it as dung cake or they plaster it on the wall so that it gets dry. In such way, animal dung has begun to be used as fuel. Second, when fuel wood becomes scarce households start to collect dry dung from the neighborhood. Third, when fuel become more scarce together with the reduction in the number of animals, dung has also become so scarce and households forced to collect even fresh dung from the place where animals graze. An old man in Telfetit expressed this:

> *"Women collect the dung putting the animal aside when they drop dung while lying on the ground."*

c. Labour Migration

Seasonal migration if it is successful, provides solution to the immediate and urgent problem of households by providing employment opportunity. However if not well planned and is not systematic, it can drain agricultural labour force from the rural areas that are important for agricultural development and resource management activities. Moreover, if migrants are unable to get employment in the destination area or if the income is very low, it desperately affect the migrants as well as their families who stay behind in their village.

d. Income Generation

The very common income generating activities that are currently performed by households in the study areas is local drink processing. This activity requires a great deal of women's labour specially for fetching water and fuel wood. In addition, this adds further pressure on the natural environment, especially extraction of fuel wood and water.

6.2.2 Resource Management Activities

a. Land Conservation Activities

The land conservation activities in the study area are determined by the availability of male labour in a household who can be involved in conservation activities. Respondents were asked whether they undertake any land conservation activity to protect their farmland from soil erosion. As shown in Table 26, the majority (68%) of the respondents from the household of male headed has noted that there is some conservation practices on their family plot as compared to 48% of respondents from the household of female headed. More than half (52%) of the respondents from the household of female headed do not undertake any conservation

activities on their land since it is another farmer who work on their plot on a share cropping arrangement.

Table 26. Distribution of Respondents by Type of Head of Household and Soil Conservation Activities on Own Farm

Soil Conservation Activities on Own Farm	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
YES	24	68.5	16	48
NO	10	28.5	17	52
Can't Say	1	3	-	-
Total	35	100	33	100

In addition to individual efforts, department of agriculture promotes land conservation activities. Both men and women participate in soil and water conservation activities that are undertaken at household and *Kebele* levels.

b. Tree Plantation Activities

Realizing the depletion of natural tree cover, some households in the highland are planting trees, mainly eucalyptus, for various purposes such as house construction, farm tools, for sale and fuel. As it was observed during the fieldwork, households in the highland *Kebele* are more involved in tree plantation than in the lowland *Kebele*.

Respondents were asked whether their households plant tree or not. More than half (51.5%) of the RMHHs and 27.5% RFHHs in the two *Kebele*s replied yes (Table 27) This data indicates that relatively high number of RMHHs plant tree than RFHHs. There could several reasons such as absence of male labour, lack of time, lack of access to agricultural extension program, lack of access to tree seedling, etc. In the male headed households, both men and women including their children participate in tree plantation activities, the men being the major actors in the actual plantation and women in the task of water fetching and watering small trees.

Table 27. Distribution of Respondents by Type of Head of Household and Tree Plantation Initiative

Tree Plantation Initiative	Type of Head of Household			
	MHH		FHH	
	No.	%	No.	%
YES	21	52.5	11	27.5
NO	19	47.5	29	72.5
Total	40	100	40	100

In addition to the above resource management activities, women use the resources such as water, fuel and even food in an economic way.

The *Wereda* department of agriculture is working towards improving the conditions of natural resources in the *Wereda*. It implements tree plantation and soil and water conservation activities by involving the local communities i.e. both men ands women.

VII SUMMARY ANALYSIS AND CONCLUSION

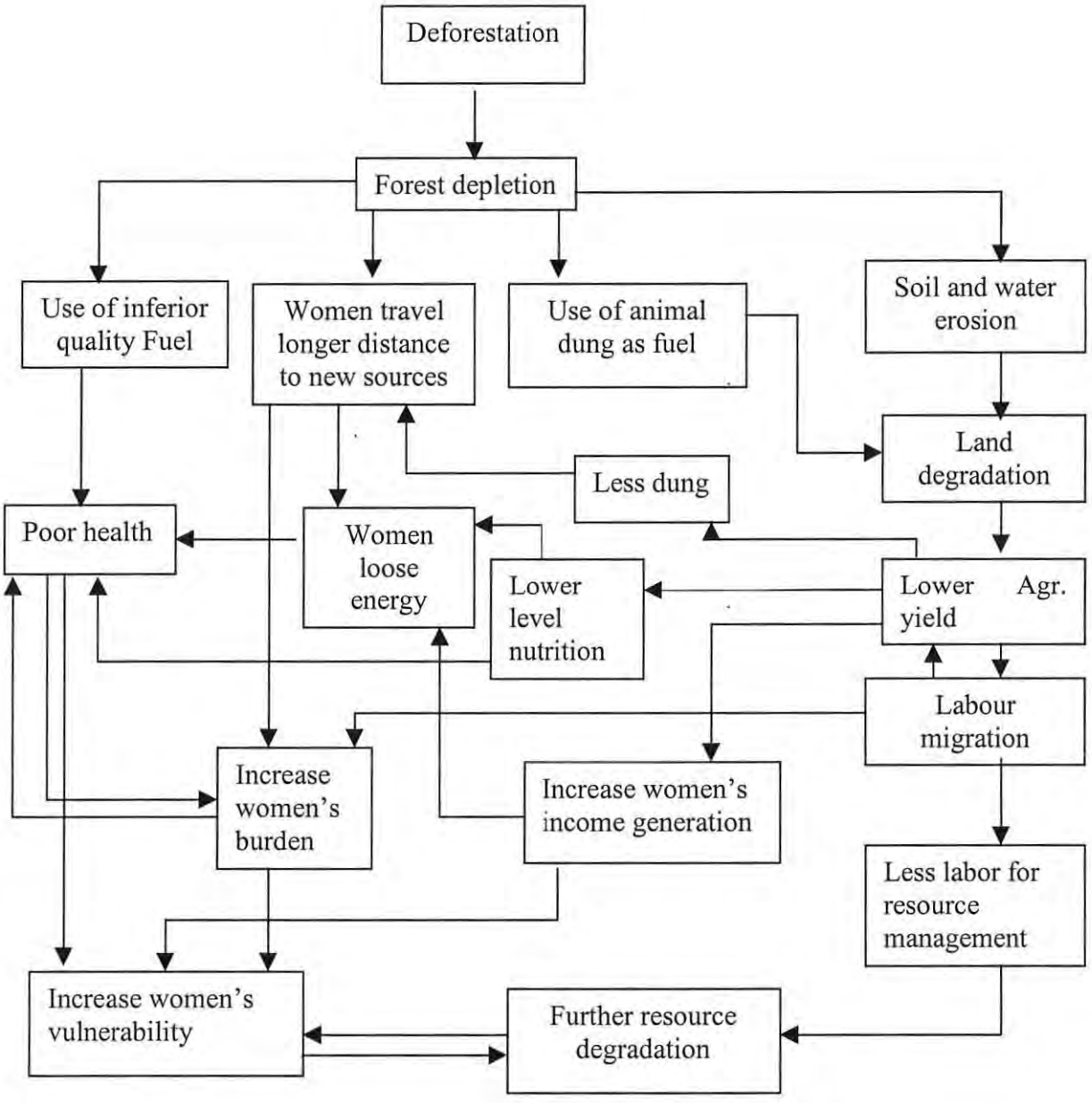
7.1 Summary Analysis

Land, forest and water resources are seriously deteriorating in the study area affecting the lives of the rural households in general and the conditions of women in particular. Since the *Wereda* is repeatedly exposed to drought and people are unable to produce sufficient food they have become dependent on relief food for long time.

Being responsible for fuel and water collection, processing, preparation and supply of the daily food consumption for their families, women in the study area are the first to face the concern and anxiety due to food shortage, fuel scarcity and water shortages. Beyond increasing time spent and workload for women when these resources are in short supply, there are different complex and interdependent problems that they encountered.

As indicated in Figure 2, the study has identified forest resource depletion as one of the major environmental problem that is linked directly to agricultural production and household food security. Moreover, as indicated in the same figure the implications to women are not only simply increasing time spent in fuel gathering but also loss of the limited caloric intake in the face of food shortage, work burden and health problem. As portrayed indicated in the same figure, deforestation has directly and indirectly implications on agricultural productivity through loss of soil nutrients in two ways. The cutting of trees exposes farmlands for water and soil erosion and the use of manure as fuel due to shortage of fuelwood compete with its use as "soil conditioning".

Figure 2: Forest Resource Depletion: Women's Vulnerability and Environmental Crisis



Generally speaking, the degradation of soil fertility, erratic nature of the rainfall and land fragmentation are the major environmental factors that caused lower productivity of agriculture in the study *Wereda*.

It is found out that the environmental related problems are sever for the houses of female headed since they are burden the environmental crises alone (only with little help from children); and earn only part of the produce from their land. The study has identified the economic and social factors that play a part in the process of land degradation in the houses of female headed. The economic factors are lack of oxen, lack of seed and absence adult male labour while the socio-cultural factors include females do not plough, and have less bargaining power, etc.

In addition to the above factors, fertility and distance to farmlands influence the share of those FHHs who rent out their land on share cropping arrangement. If their land is infertile and located in relatively far away places, they get only a quarter of the produces. Further more, the fertility of their land as well as its size decreases from year to year since there is little land reclamation activities carried out on their plot. This is because, the farmers who work on share cropping arrangement, i.e., tenant of usufruct holders that might be referred as "the tenants of tenants" have only short term and little interest about future productivity of the plot since they do not have any security to work on it in the future and therefore any long term interest whatsoever.

Since most households in the study area are unable to produce enough food even for their own consumption, they respond to the food shortage in different ways. The major mechanisms include saving food grain, borrowing, selling animals, on farm non agricultural employment, off-farm employment and relief food. Women have important place to play in these processes since they are the ones who process, prepare as well as distribute food to their household members.

Both married and single women are increasingly engaged in income generating activities mainly local beverage processing which further requires their scarce labor, water and fuel resources. *Tela* selling was an activity that was often carried out mainly by female-headed households in the past. Nevertheless, with increasing food shortage in the area, married women's involvement in this activity has also increased.

When life in the rural areas becomes very tough, both male headed and female headed households together with their families migrate to other places including to previous re-settlement areas in search of employment opportunity. There are also cases when men migrate and women stay behind together with children in the rural areas being responsible for the farming and the overall management of their children. The absence of male labour from the rural areas has negative implication on natural resource management.

Female headed households mostly migrated to towns especially to Lalibela and often engaged in fuelwood selling and casual labor.

During the study period, it is found out that there were families who have already migrated to other areas, 2-3 months immediately after harvesting which shows how the food shortage was serious.

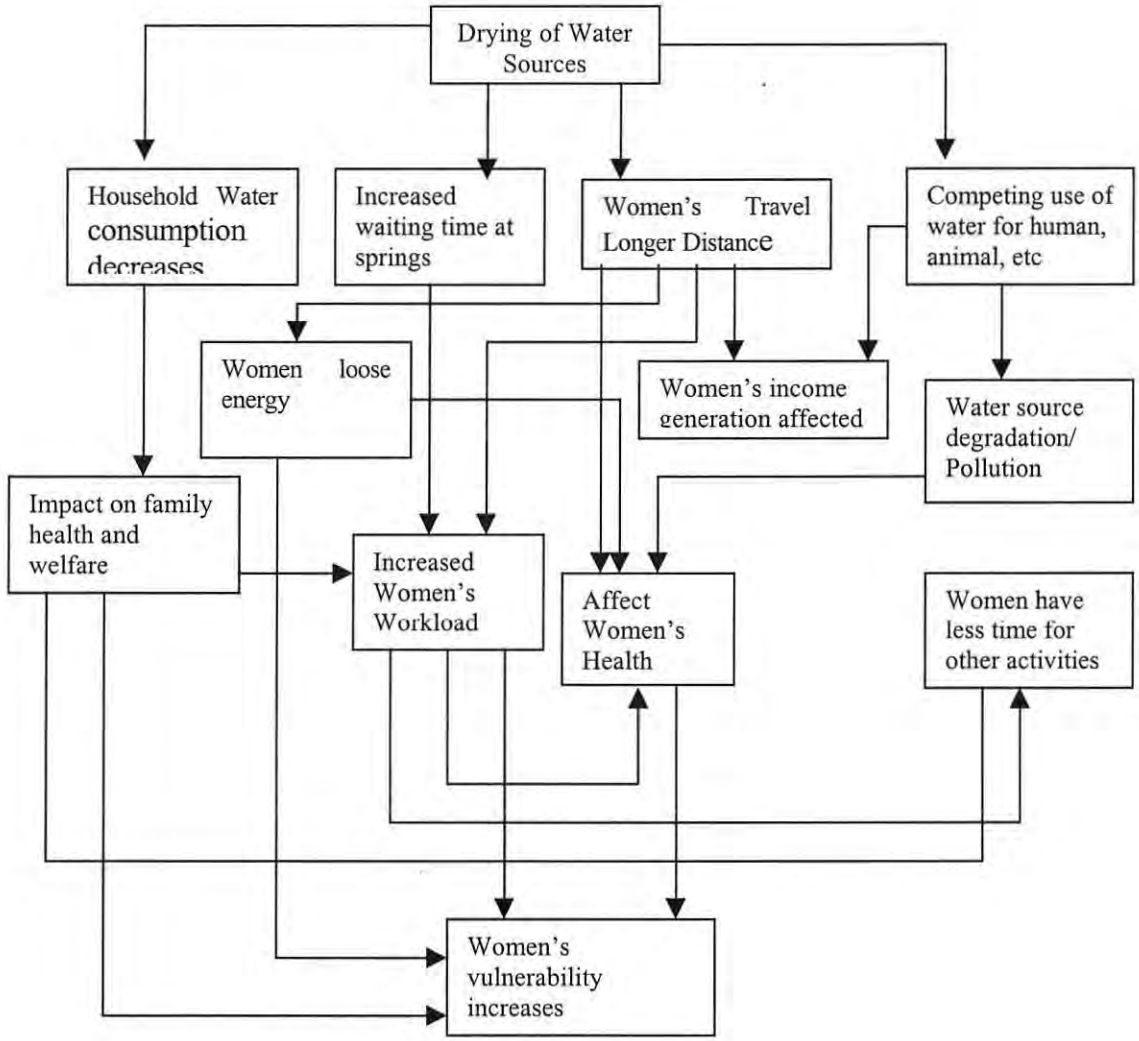
Fuel has become one of the very scarce resources in the study areas. As a result, women had to spend more hours in travelling to remnant forests and are forced to use inferior quality fuel. Men are found to be very concerned with the shortage of fuelwood. Sharing in the task of fuelwood collection by men was observed in the lowland *Kebele* since the source of fuelwood was located in Tekeze Valley which was difficult for women to travel as well as to cut trees. On the contrary, men's involvement in fuel gathering should not be exaggerated since due to depletion of trees, many households have become more dependent on animal dung than wood for household energy. On the other hand, in the highland *Kebele,* eucalyptus trees that are planted in individual backyards are contributing to household fuel and sharing women's burden.

On the view expressed by Yeraswork's (1995) concerning the degradation impact on the rural community, further comments can be incorporated into the system of Forest Resource Depletion: Women's vulnerability and Environmental Crisis, Figure 2 and Water Resource Degradation and the Impact on Women and their Families, Figure 3. Traveling and spending more hours in water and fuel collection require more energy while households lack enough food and have reduced their caloric intake due to food shortage. And women who are the main water and fuel carriers in many households are made to suffer from a double-edged sword.

It is also found out that the smokes of inferior quality fuel such as *kinchib,* animal dung, eucalyptus leaf, sisal plant, and some others, is affecting women's health (eye disease and respiratory tract infection). In addition, since these fuels are not up to the standard, they are required in large quantities requiring women's time and energy for gathering, tending the fire carefully and frequent feeding of the fuels.

The ongoing water resource degradation in terms of quantity as well as quality in the study areas negatively affect women (who are the water carriers and providers) and their families in a number of ways as shown in Figure 3 below.

Figure 3: Water Resource Degradation and Implications to Women and their Families



As shown in the figure above, when the amount of water in their village decreases, women spend more time waiting at the water points till the wells filled up and waiting for their turn. In both the lowland and the highland *Kebeles*, waiting time at springs is increasing and may go upto 2 hours since availability of water decreases in direct proportion to the increasing population.

Moreover, as portrayed in the above figure, when water scarcity becomes very serious, women travel relatively longer distances to other sources. During the dry season, when water shortage is serious, women travel relatively longer distances (1-2 hours) to fetch water from rivers. In the lowland, they travel in a tough hot climate while in the highland they climb steep slopes that demand on their energy.

It is found out that the amount of water that a household consumes per day is much lower than the standard set by WHO which is 40-50 liters per person per day (Rodda, 1991 citing WHO). This has implications on the health of women and their families. Moreover, water resources in the study areas are little protected from animals and in appropriate human interventions and as a result, water carriers and their families are exposed to water born diseases.

In addition to putting demands on their energy and health, the increasing time spent by women in water fetching and fuel gathering, affects women's time distribution among childcare and productive activities which are important for the welfare of their families.

Unsustainable cutting of trees, and use of dung as fuel exposes the forest and land for further degradation. In their effort to make ends meet, women are forced to exert more pressure on the already deteriorated environment. They eke out a living under the more or less impossible demand of survival of their families, on the one hand, and long-term sustainable use of resources, on the other. Being responsible for management of resources for household consumption, women usually economize the use of grain, fuel and water in their households owing the scarcity and the shortages. Nevertheless, when problems become serious and beyond control, it is obvious that they have to make sure that their families have food every day even at the expense of the scarce natural resources. In this way women contribute to the degradation process caught in a vicious circle of vulnerability.

Women also participate in different environmental rehabilitation activities which are carried out both at household and community levels. These activities include, soil and water conservation and tree plantation activities.

7.2 Conclusion

Both men and women utilize natural resources for various purposes in line with the gender division of labour in their households. Since men and women mostly have different roles and responsibilities, natural resource degradation often affect them differently.

In the study area, erosion operating through various forms i.e. sheet erosion, development of gully and land slide, is major cause of loss of soil fertility and reduction of cultivable surface area. The problem is more sever in the highland due to the topography of the land. Among

other factors, land degradation and repeated drought have caused deterioration of agricultural productivity and consequently led to household food insecurity.

The land degradation process continues when households migrate to other areas in search of employment opportunity to fulfill short-term household basic needs. Withdrawal of agricultural labour from the area is causing further land degradation since less conservation activities are carried out on farmlands. From year to year productivity deteriorates and places households in a vicious circle of poverty.

Moreover, women being responsible for food preparation and distribution in their households, they are the first who face the concern and anxiety due to food shortage. They have to involve themselves in income generating activities or they have to migrate to other areas together with their families. When their husbands migrate and women stay behind in the rural areas, they become burdened with many responsibilities including farming.

Female headed households who comprise 25% of the total households in the study area are found to be one of the seriously affected groups by the existing land degradation. Due to lack of oxen and male labour which is essential for ploughing, female headed households often rent out their land on share cropping farm arrangement. Since less land reclamation activities are carried out on their plot, their share from crop production decreases from year to year together with degradation of their land.

The depletion of forest resources have forced many households to travel longer distances in search of fuelwood and also to switch to inferior fuel quality. At present, the major sources of fuel in the study areas are animal dung and bushes. Women spend more hours in the collection of fuel, and it requires their scarce time and limited energy. Moreover, since good quality fuels are no more available in the area, use of less quality fuel negatively impacts women's daily work as well as their health.

Water being one of the scarce resources in the areas, 4-5 villages share a small spring. The depletion of water has increased women's waiting time at the water points and forced them to travel relatively longer distance in search of new sources. Women carry and transport up to 20 liters of water at their backs for 1-2 hours in a difficult and dangerous path several times a day. This task being routine and heavy, it consumes the limited calorie that women take in the face of food shortage.

To conclude, the degradation of natural resources in the study area which resulted in reduced supply of resources has caused wider and complex implication on women, their families and their environment.

References

Alemneh Dejene, E, Shishira, P. Z, Yanda, F. H, Johnson (1997): *Land Degradation in Tanzania, Perception from the Village*. World Bank Technical Paper, Washington, USA.

Ardayfio- Schandorf, E. (1993): *Household Energy Supply and Rural Women's Work in Ghana*. In: Different Places Different Voices (Momsen, J.H. *et al.*, eds.). Routledge, London.

Bina, A. (1992): *The Gender and Environmental Debate*: Lesson from India, Feminist Study 18, No.1

Bina, A. (1997): *Environment Action, Gender Equity and Women's participation, in Development and Change*. ISS Journal, Vol. 28, No. 1.

Blackden, G.M and C, Bhanu, (1999): *Gender, Growth, and Poverty Reduction, Special program of Assistance for Africa,* 1998 Status Report on Poverty in Sub Saharan Africa. Washington D.C., USA.

Booth, G. (1985): *Ethiopian Highland Reclamation Study, Forestry Development Strategy, Land Use Planning and Regulatory Department.* MOA/FAO/UN, Addis Ababa.

Dankelman, I. and J. Davidson (1989): *Women and Environment in the Third World, Alliance for the Future*. Earthscan Publication Ltd., London.

Davidson, J. (1993): *Women's Relationship with the Environment*. In: Women and the Environment (Reardon, G. ed.). Oxfam Focus Gender 1, Oxford UK.

Dessalegn Rahmato (1996): *Land, Population and Environment what is at issue?* In: Proceedings of the Panel Discussion on Population and Environment in Ethiopia (MEDEE National Office Population ed.). Feb. 1996, Addis Ababa.

Duraiappah, A. K. (1998): *Poverty and Environment Degradation: A review and Analysis of the Nexus.* P. 2169-2179. World Development Vol. 26, No.2 Elsevier Science Ltd., G. Britain.

Environmental Protection Authority (1997): *The FDRE Environment Policy of Ethiopia*, A.A.

Eskender, Assefa (1997): *Current Approaches of Agriculture and natural Resource Development of Bugna Wereda and BIRDP Intervention*, General Observation and Reflection Report, Lalibela.

Etalem Mengistu and Fetenu Bekele (1992): *The Role of Women in the Forestry Subsection in Ethiopia.* Ethiopian Forest Action Program (EFAP), Addis Ababa.

Ethiopia Forestry Action Program (EFAP) (1994): *Challenge for Development.* Ministry of Natural Resource and Environmental Protection Final Report Vol. 11 the EFAP Secretariat, Addis Ababa.

Ethiopian Journal of Water Science and Technology (EJWST) (1997): Proceeding of the Symposium on *Sustainable Water Resources Development in Ethiopia* Vol. I No. 1, Arbaminch.

FAO (1981): *Household Food Security and Forestry*, An Analysis of Socio-Economic Issues, Rome.

FAO /SIDA (1989): *Restoring The Balance: Women and Forest Resources.* Rome.

FAO/UN (1989): *Forestry and Food Security.* FAO Forestry Paper 90. Rome.

Fekerte Haile (1989): *Women Fuel Wood Carriers and the Supply of Household Energy in A..A.* In: Women's Role in Natural Resource Management in Africa. (Rathgeber, E. eds.).

Fikeru Abebe (1990): *The Role of Land Use Planning in the Improvement of Natural Resource Management.* In: Ethiopia's experience in Conservation and Development. Conference on National Conservation Strategy, Vol. 3, May 22-25, Addis Ababa.

ILO (no date): *Household Fuel Availabilities, Women's Work, and Family Nutrition Some Evidence to Date and Suggested Research Areas.* World Employment Program Rural Employment Policies Branch. Geneva, Switzerland.

INSTRAW (1989a): *Women, Water Supply And Sanitation: Making the Link Stronger.* Santo Doming, Dominican Republic.

INSTRAW News (1989b): *Women in Development, Water and Sanitation, the Vital Role of Women.* No. 13.

INSTRAW (1993): *Women and Development Double Issue,* N0. 19.

Kruger, H. J. and Solomon Abate (1994): *Proposal for the Development of A Soil and Water Conservation Strategy in Bugna Wereda.* Mission Report 14-18 June 1994, Bugna Integrated Rural Development Program of SNV.

Lakech Haile (1998): *Situation of the Water Sector and Gender in Ethiopia:* An Overview, Paper Presented for the Workshop on Gender Issues in WES (9-12March, 1998), NETWAS,Nairobi,Kenya.

Reardon, G. (1993): *Women and the Environment.* Oxfam Focus on Gender 1, Oxford, UK.

Rodda, A. (1991): *Women and the Environment,* Zed Books Ltd, London.

Sayles, A. (1999): *Health Profile and Action Plan for Bugna Wereda* (North Wello Zone, Amhara Region). Residency Report, AAU, Faculty of Medicine, Department of Community health, Addis Ababa.

Shibru Tedla (1996): *Population, Biomass Fuel and Environment in Ethiopia.* In: Proceedings of the Panel Discussion on Population and Environment in Ethiopia (MEDEE National Office Population ed.). Feb. 1996, Addis Ababa.

Sinkam, S. (1995): *Land and Environmental Degradation and Desertification in Africa:* Issues and Options for Sustainable Economic Development with Transformation. Joint ECA/FAO Agricultural Division Monograph.

Sonthimer, S. (1991): *Women and Environment.* Earthscan Publication. London.

SNV-Ethiopia (1993): *Final Project Proposal for the Construction and Rehabilitation of Rural Roads for Bugna and Gidan Weredas.* Addis Ababa.

The Ethiopian National Report (ENR) (1992): *Environment and Development,* A Report prepared for the UN Conference on Environment and Development, Rio De Jenerio, Brazil, A. A., Ethiopia.

The Conservation Strategy of Ethiopia Vol. I, *The Resources Base, Its Utilisation and Planning for sustainability*, April 1997.

TGE/UNICEF/WIBS (1994): *Baseline Survey Results November-December 1993, Bugna Wereda-Rural*, Region 3.

UN/ECA (1981): *Workshop of firewood and Energy Development for Rural African Woman,* Bamako, Mali 2-13 December 1980, ST/EEA? ATRCW/81/20.

UN/ECA/ACW (1994): 5th African Regional Conference on Women 16-23 November 1994 Dakar, Senegal Vol. 2 Conference Papers on Priority Issues Part V., Women Environment and Sustained Development.

UN/ ECA (1996): *A study of the Economic Empowerment of Women and Their Role in the Socio-Economic Development of Africa.* Aug. 1996, A.A., Ethiopia.

UN/ OAU (1994): *African Platform for Action, African for the Advancement of*

Women. Adopted at the Fifth African Regional Conference on Women, November 16-23 1994 Dakar, Senegal.

UNDP/ECA, Sustainable Agriculture and Environmental Protection SAERP)/*Woreda* Agriculture and Rural Development (WARDIS) (1997): *Women in Development Program Zone 2, Afar National Regional State, Federal Republic of Ethiopia*, UNDP/ECA project ETH 94/001/01/99, Vol. X, Addis Ababa.

World Bank (WB) / the Women's Affairs Office (WAO) of Federal Democratic Republic of Ethiopia (FDRE) (1998): *Implementing the Ethiopian National Policy for Women: Institutional and regulatory issues.* Washington D. C.

Yeraswork, Admassie (1995): *Twenty Years to Nowhere*: Property Rights Land Management and Conservation in Ethiopia. Dept. of Sociology, Uppsala University.

Yonael, Teklul. (1990): *Rural Energy Requirements.* In: Government of Democratic Republic of Ethiopia National Conservation Strategy. Conference Document, Ethiopia Experience in Conservation and Development, Vol. 3 ONCCP, Addis Ababa.

References

Alemneh Dejene, E, Shishira, P. Z, Yanda, F. H, Johnson (1997): *Land Degradation in Tanzania, Perception from the Village*. World Bank Technical Paper, Washington, USA.

Ardayfio- Schandorf, E. (1993): *Household Energy Supply and Rural Women's Work in Ghana*. In: Different Places Different Voices (Momsen, J.H. *et al.*, eds.). Routledge, London.

Bina, A. (1992): *The Gender and Environmental Debate*: Lesson from India, Feminist Study 18, No.1

Bina, A. (1997): *Environment Action, Gender Equity and Women's participation, in Development and Change*. ISS Journal, Vol. 28, No. 1.

Blackden, G.M and C, Bhanu, (1999): *Gender, Growth, and Poverty Reduction, Special program of Assistance for Africa,* 1998 Status Report on Poverty in Sub Saharan Africa. Washington D.C., USA.

Booth, G. (1985): *Ethiopian Highland Reclamation Study, Forestry Development Strategy, Land Use Planning and Regulatory Department.* MOA/FAO/UN, Addis Ababa.

Dankelman, I. and J. Davidson (1989): *Women and Environment in the Third World, Alliance for the Future.* Earthscan Publication Ltd., London.

Davidson, J. (1993): *Women's Relationship with the Environment*. In: Women and the Environment (Reardon, G. ed.). Oxfam Focus Gender 1, Oxford UK.

Dessalegn Rahmato (1996): *Land, Population and Environment what is at issue?* In: Proceedings of the Panel Discussion on Population and Environment in Ethiopia (MEDEE National Office Population ed.). Feb. 1996, Addis Ababa.

Duraiappah, A. K. (1998): *Poverty and Environment Degradation: A review and Analysis of the Nexus.* P. 2169-2179. World Development Vol. 26, No.2 Elsevier Science Ltd., G. Britain.

Environmental Protection Authority (1997): *The FDRE Environment Policy of Ethiopia*, A.A.

Eskender, Assefa (1997): *Current Approaches of Agriculture and natural Resource Development of Bugna Wereda and BIRDP Intervention*, General Observation and Reflection Report, Lalibela.

Etalem Mengistu and Fetenu Bekele (1992): *The Role of Women in the Forestry Subsection in Ethiopia.* Ethiopian Forest Action Program (EFAP), Addis Ababa.

Ethiopia Forestry Action Program (EFAP) (1994): *Challenge for Development.* Ministry of Natural Resource and Environmental Protection Final Report Vol. 11 the EFAP Secretariat, Addis Ababa.

Ethiopian Journal of Water Science and Technology (EJWST) (1997): Proceeding of the Symposium on *Sustainable Water Resources Development in Ethiopia* Vol. I No. 1, Arbaminch.

FAO (1981): *Household Food Security and Forestry*, An Analysis of Socio-Economic Issues, Rome.

FAO /SIDA (1989): *Restoring The Balance: Women and Forest Resources.* Rome.

FAO/UN (1989): *Forestry and Food Security.* FAO Forestry Paper 90. Rome.

Fekerte Haile (1989): *Women Fuel Wood Carriers and the Supply of Household Energy in A..A.* In: Women's Role in Natural Resource Management in Africa. (Rathgeber, E. eds.).

Fikeru Abebe (1990): *The Role of Land Use Planning in the Improvement of Natural Resource Management.* In: Ethiopia's experience in Conservation and Development. Conference on National Conservation Strategy, Vol. 3, May 22-25, Addis Ababa.

ILO (no date): *Household Fuel Availabilities, Women's Work, and Family Nutrition Some Evidence to Date and Suggested Research Areas*. World Employment Program Rural Employment Policies Branch. Geneva, Switzerland.

INSTRAW (1989a): *Women, Water Supply And Sanitation: Making the Link Stronger*. Santo Doming, Dominican Republic.

INSTRAW News (1989b): *Women in Development, Water and Sanitation, the Vital Role of Women*. No. 13.

INSTRAW (1993): *Women and Development Double Issue,* N0. 19.

Kruger, H. J. and Solomon Abate (1994): *Proposal for the Development of A Soil and Water Conservation Strategy in Bugna Wereda.* Mission Report 14-18 June 1994, Bugna Integrated Rural Development Program of SNV.

Lakech Haile (1998): *Situation of the Water Sector and Gender in Ethiopia:* An Overview, Paper Presented for the Workshop on Gender Issues in WES (9-12March, 1998), NETWAS,Nairobi,Kenya.

Reardon, G. (1993): *Women and the Environment*. Oxfam Focus on Gender 1, Oxford, UK.

Rodda, A. (1991): *Women and the Environment,* Zed Books Ltd, London.

Sayles, A. (1999): *Health Profile and Action Plan for Bugna Wereda* (North Wello Zone, Amhara Region). Residency Report, AAU, Faculty of Medicine, Department of Community health, Addis Ababa.

Shibru Tedla (1996): *Population, Biomass Fuel and Environment in Ethiopia*. In: Proceedings of the Panel Discussion on Population and Environment in Ethiopia (MEDEE National Office Population ed.). Feb. 1996, Addis Ababa.

Sinkam, S. (1995): *Land and Environmental Degradation and Desertification in Africa:* Issues and Options for Sustainable Economic Development with Transformation. Joint ECA/FAO Agricultural Division Monograph.

Sonthimer, S. (1991): *Women and Environment*. Earthscan Publication. London.

SNV-Ethiopia (1993): *Final Project Proposal for the Construction and Rehabilitation of Rural Roads for Bugna and Gidan Weredas*. Addis Ababa.

The Ethiopian National Report (ENR) (1992): *Environment and Development,* A Report prepared for the UN Conference on Environment and Development, Rio De Jenerio, Brazil, A. A., Ethiopia.

The Conservation Strategy of Ethiopia Vol. I, *The Resources Base, Its Utilisation and Planning for sustainability*, April 1997.

TGE/UNICEF/WIBS (1994): *Baseline Survey Results November-December 1993, Bugna Wereda-Rural*, Region 3.

UN/ECA (1981): *Workshop of firewood and Energy Development for Rural African Woman,* Bamako, Mali 2-13 December 1980, ST/EEA? ATRCW/81/20.

UN/ECA/ACW (1994): 5th African Regional Conference on Women 16-23 November 1994 Dakar, Senegal Vol. 2 Conference Papers on Priority Issues Part V., Women Environment and Sustained Development.

UN/ ECA (1996): *A study of the Economic Empowerment of Women and Their Role in the Socio-Economic Development of Africa*. Aug. 1996, A.A., Ethiopia.

UN/ OAU (1994): *African Platform for Action, African for the Advancement of*

Women. Adopted at the Fifth African Regional Conference on Women, November 16-23 1994 Dakar, Senegal.

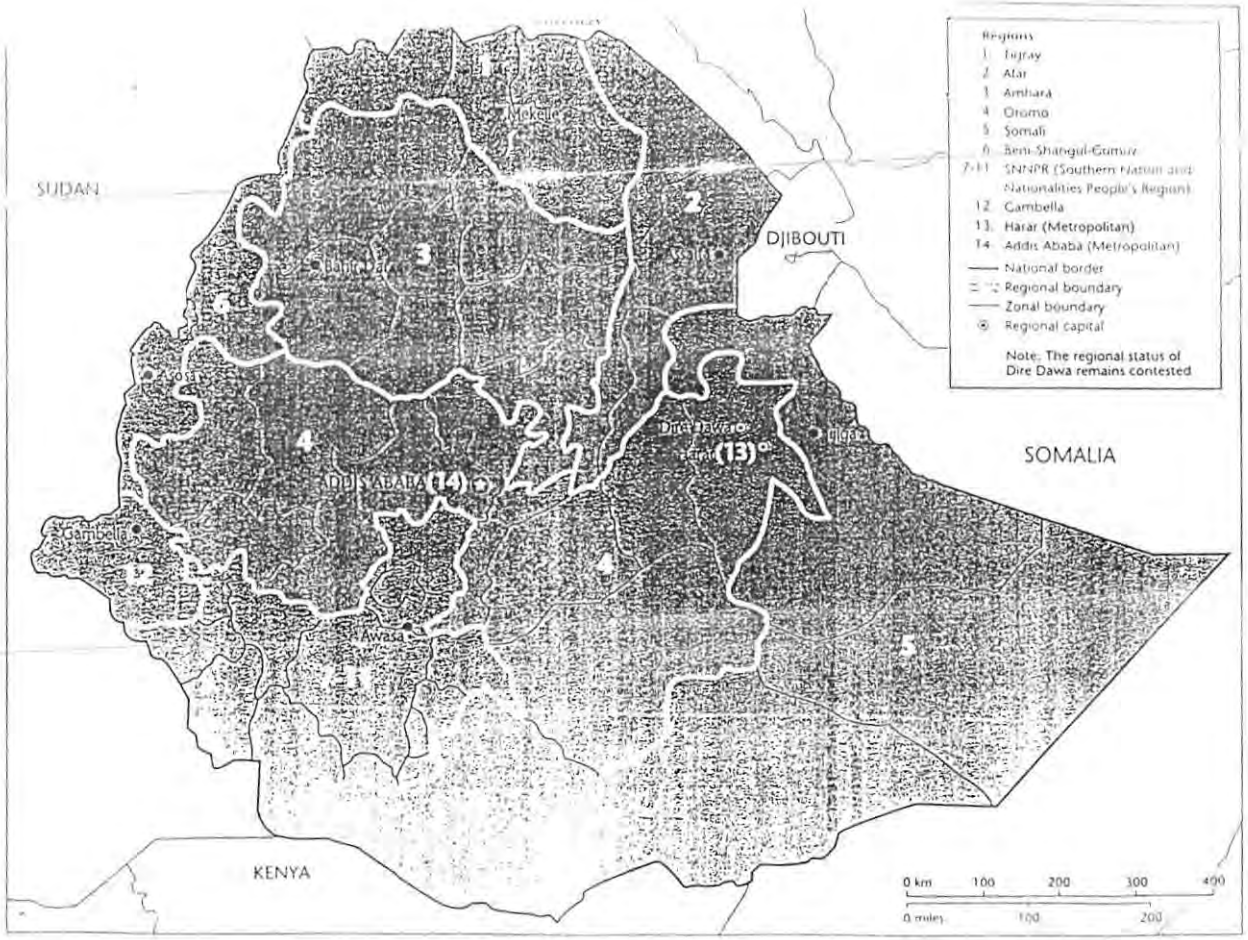
UNDP/ECA, Sustainable Agriculture and Environmental Protection SAERP)/*Woreda* Agriculture and Rural Development (WARDIS) (1997): *Women in Development Program Zone 2, Afar National Regional State, Federal Republic of Ethiopia*, UNDP/ECA project ETH 94/001/01/99, Vol. X, Addis Ababa.

World Bank (WB) / the Women's Affairs Office (WAO) of Federal Democratic Republic of Ethiopia (FDRE) (1998): *Implementing the Ethiopian National Policy for Women: Institutional and regulatory issues.* Washington D. C.

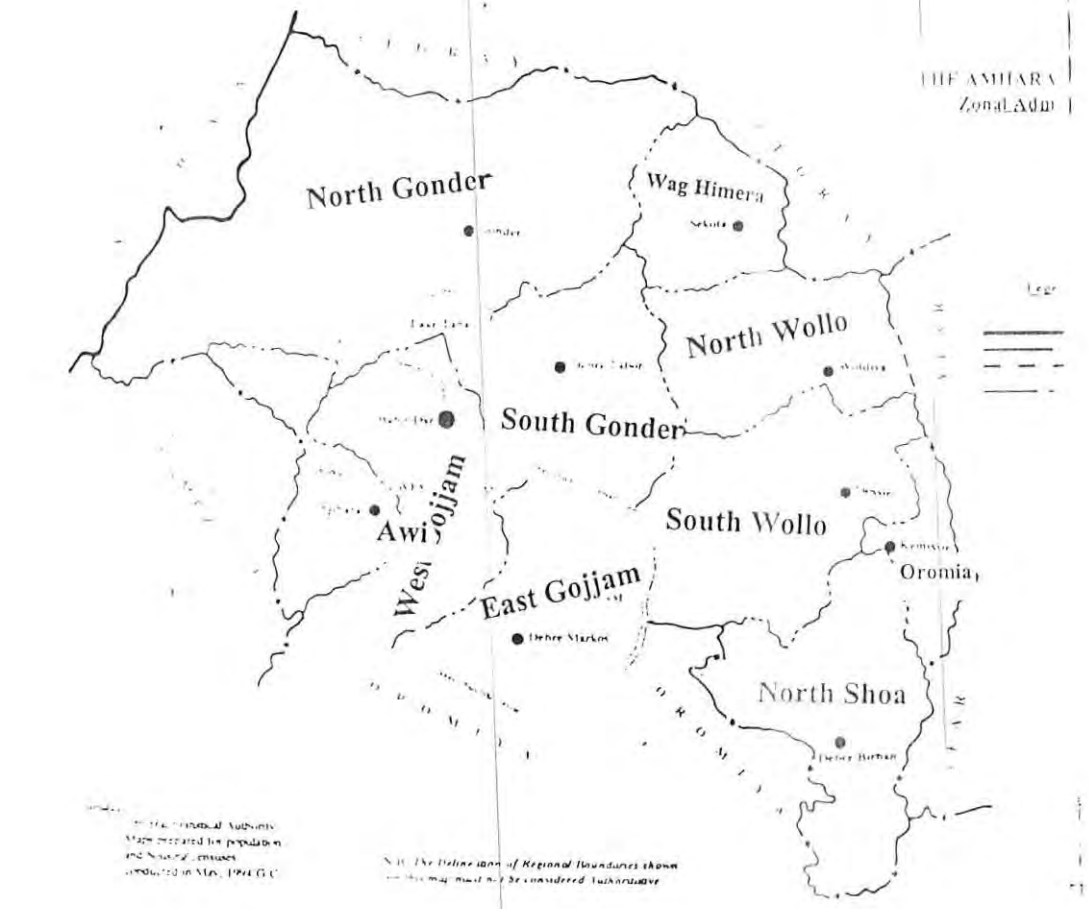
Yeraswork, Admassie (1995): *Twenty Years to Nowhere*: Property Rights Land Management and Conservation in Ethiopia. Dept. of Sociology, Uppsala University.

Yonael, Teklul. (1990): *Rural Energy Requirements*. In: Government of Democratic Republic of Ethiopia National Conservation Strategy. Conference Document, Ethiopia Experience in Conservation and Development, Vol. 3 ONCCP, Addis Ababa.

Maps

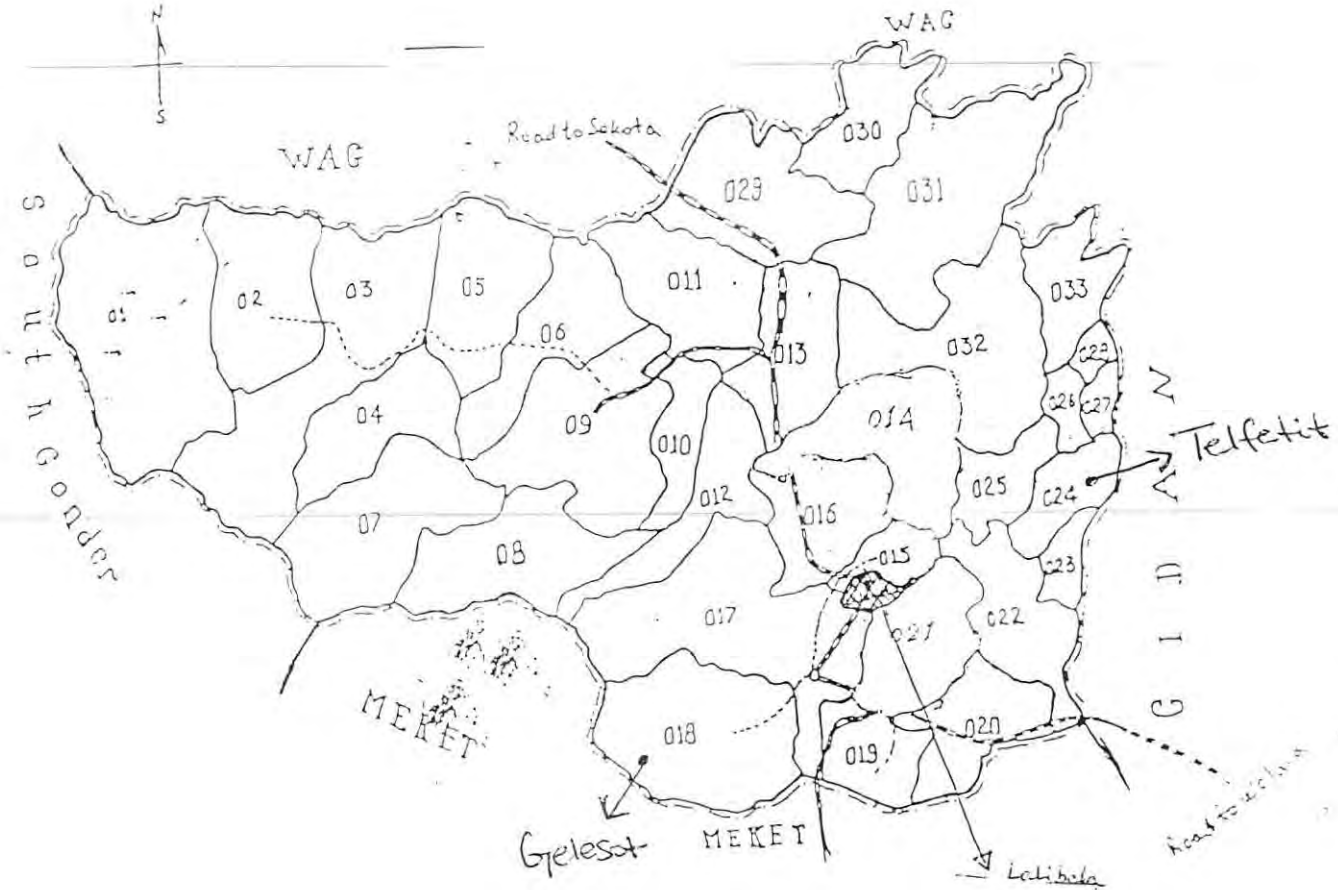

Regions
1. Tigray
2. Afar
3. Amhara
4. Oromo
5. Somali
6. Beni-Shangul-Gumuz
7-11. SNNPR (Southern Nation and Nationalities People's Region)
12. Gambella
13. Harar (Metropolitan)
14. Addis Ababa (Metropolitan)
National border
Regional boundary
Zonal boundary
Regional capital
Note: The regional status of Dire Dawa remains contested
SUDAN
DJIBOUTI
SOMALIA
KENYA
ADDIS ABABA (14)
(13)
Gambella
Awasa
0 km 100 200 300 400
0 miles 100 200

Map of the Amhara National Regional State: Zonal Administrative Division



Source: PPD/BOPED

Map of Bugna *Wereda*



Annexes

Annex 1 **Survey Questionnaire for Female Headed Households and Wives**

Name of enumerator_____**Date/Month/** ☐☐☐☐

Time Begin (local time) ☐☐☐☐

Time End (local time) ☐☐☐☐

Name of the Respondent _____**Serial No** ☐☐

1. Household Location

1.1 Kebele (018=1, 024=2) ☐

1.2 Sub Kebele ☐

1.3 *Mengistawi buden* ☐

1.4 Gott ☐

1.5 Village ☐

1.6 Type of Agro- Ecological Zone (Dega=1,Woyna Dega=2, Kolla=3) ☐

2. General

2.1 Household type (Male headed=1,Female headed =2) ☐

2.2 Age ☐☐

2.3 Marital status (Married=1 Widowed=2 Divorced=3 Separated =4 Unmarried =5) ☐

2.4 Family Size ☐☐

2.5 Total Number of Children you give birth to ☐☐

2.6 No. of Girls living with you ☐☐

2.7 No. of Boys living with you ☐☐

2.8 Educational status (Literate =99,Illiterate=88) ☐☐

(For grades completed indicate 01,02,03, etc.) ☐☐

2.9 Religion (Orthodox Christian=1, Muslim=2, Others=3) ☐

2.10 For how long have you lived in the area? (e.g. 01,02,03,etc) ☐☐

(in years) and 99 for less than one year

3. Household Resources and Means of Livelihood

3.1 What is **the major** occupation of the household?

(Crop production=01, Animal husbandry =02, Mixed farming=03, Handicraft=04, Trading=05, Other (specify)_____) ☐☐

3.2 Who is involved in agricultural activities in your households?

(Husband =1,Wife=2, Sons=3,Daughters=4, All = 5, Other (specify)_____) ☐

3.3 Does your household has supplementary income? (Yes=1, No=2) ☐

3.4 If the answer for **Q No 3.3 is Yes** what is **the major** source?

(Crop production=01, Animal husbandry =02, Mixed farming=03, Handicraft=04, Trading=05, Fuelwood Selling= 06, Bee keeping=07, Daily labor=08, Others (specify)_____) ☐☐

3.5 Who is **more** involved in supplementary income activities in your households?

(Husnand=1, Wife=2, Sons=3, Daughetrs=4, Other (specify)_____) ☐

3.6 Does your household own land (Yes=1, No=2) ☐

3.7 If the answer for **Q No 3.6 is Yes**, what is the land use pattern?

Vegetable (Yes=1, No=2) ☐

Crop land (Yes=1, No=2) ☐

Grazing land (Yes=1, No=2) ☐

Fallow Land (Yes=1, No=2) ☐

Woodlot (Yes=1, No=2) ☐

3.8 If the answer **for Q No 3.6 is Yes**, what is the total size of your family plot? ☐☐

(In Timad, use decimal number such as 0.5,0.25, etc.)

3.9 What type of plot does your household have?

("Wejed"=1, Breha Meret"=2, Both =3) ☐

3.10 How many hours does it take a round trip to your plot on foot?

(Less than 1 hour=2, 1 to 2 hours=2, Over 3 hours=3) ☐

3.11 Do you have irrigated land? (Yes=1, No=2) ☐

3.12 If the answer for **Q No 3.11 is Yes,** Where is the location?

(Backyard=1, Remote=2) ☐

3.13 If the answer for **Q No 3.12** is remote, how far?

(Less than 1 hour=2, 1 to 2 hours=2, Over 3 hours=3) ☐

3.14 Does your household use fertilizer for agricultural activities? (Yes=1,No=2) ☐

3.15 If the answer for **Q. No 3.14 is Yes**, what?

(Chemical fertilizer=1, Animal dung=2) ☐

3.16 Does your household farmland has soil erosion problem? (Yes=1,No=2) ☐

3.17 If the answer **Q no 3.16 is Yes** what is its impact on productivity?

(Reduction=2, Nothing=1, I don't know=0). ☐

3.18 Is there any conservation measure taken by your household to stop soil erosion?

(Yes=1, No=2) ☐

3.19 **If the answer for Q No 3.18 is Yes,** what kind of measure?

(Traditional banding=1, Soil banding=2, Stone banding=3, Fallowing=3, ☐

Cut -off-drainage=5, Other (specify),_____)

3.20 If the answer for **Q No 3.18 is Yes,** have you ever involved in any

soil conservation activities?(Yes=1, No=2) ☐

3.21 Does your household own livestock? (Yes=1, No=2) ☐

3.22 If the answer for **Q No3.21` is Yes**, what and how many?

3.22.1 Ox ☐☐

3.22.2 Cow ☐☐

3.22.3 Donkey ☐☐

3.22.4 Horse/Mule ☐☐

3.22.5 Goat/Sheep ☐☐

3.23 What are your household's sources of animal feed?

3.23.1 Communal Grazing (Yes=1, No=2) ☐

3.23.2 Around the backyard (Yes=1, No=2) ☐

3.23.3 Household own grazing land (Yes=1, No=2) ☐

3.23.4 Cut and carry grass or fodder plants (Yes=1, No=2) ☐

3.23.5 Crop Residue (Yes=1, No=2) ☐

3.23.6 Weeding plant (Yes=1, No=2) ☐

3.24 If the answer for **Q. No 3.23.4 is Yes,** who **often** collect animal feed?

(Husband =1,Wife=2, Sons=3,Daughters=4, Others (specify)_____) ☐

3. 25 How is your household agricultural production for the last 5 years?

(Increasing=3, No change=2, Decreasing=1, Can't tell=0) ☐

3. 26 If the answer for **Q No. 3.25 is Decreasing,** what is the major causes?

(Erosion=1, Pest/Disease=2, Lack of agricultural inputs=3, ☐

Other (Specify),_____)

3.27 When your annual agricultural production decreases, what are your household's coping mechanism? (**Prioritize five**)

First_____

Second_____

Third_____

Fourth_____

Fifth_____

4. Information about Natural Resources

Water Resources

4.1 Which are the main sources of water for your households? (**Prioritize two**)

(River=1, Spring=2, Pond=3, Hand dug wells=4, Pipe water=5)

First Priority ☐

Second Priority ☐

4.2 Who fetches water often for your household uses?

(Husband=1,Wifee=2,Sons=3, Daughters =4, Others (Specify)_____) ☐

4.3 If children are involved in fetching water, how old are they?

(Less than 7 years old=1, 7-10 years old=2, 11=15 years old=3, ☐

Over 15 years old=4)

4.4 How many '*ensera*' of water collected per day in your household? ☐☐

4.5 How many '*ensera*' of water does your household consume per day? ☐☐

4.6 When is your water requirement increase? _____

Why? _____

4.7 For what purposes is water collected in your households other than for drinking and cooking?

4.7.1 Washing (Yes=1, No=2) ☐

4.7.2 Animal consumption (Yes=1, No=2) ☐

4.7.3 income generating activities (Yes=1, No=2) ☐

4.7.4 Gardening (Yes=1, No=2) ☐

4.7.5 Tree plantation (Yes=1, No=2) ☐

4.7.6 Other (specify),_____) ☐

4.8 Where is the washing of clothes carried out in your household? ☐

(At Home=1, At the water points=2, In both places=3)

4.9 If the answer for **Q No 4.8 is 1 or 3**, who often fetch the water?

(Husband=1,Wife=2,Sons=3, Daughters =4, Others (specify),_____) ☐

4.10 Who often does the washing of clothes in your household?

(Husband=1,Wife=2, ,Sons=3, Daughters =4, Other (specify),_____) ☐

4.11 Where is the watering of animals carried out in your household? ☐

(At Home=1, At the water points=2, In both places=3)

4.12 If the answer for **Q No 4.11 is 1 or 3**, who often fetch water for animal use?

(Husband=1,Wife=2,,Sons=3, Daughters =4, Others (specify),_____) ☐

4.13 When there is water shortage, What do you do?

4.13.1 Travel longer distances (Yes=1, No=2) ☐

4.13.2 More efficient utilization of water (Yes=1, No=2) ☐

4.13.3 Serve uncooked meal (Yes=1, No=2) ☐

4.13.4 Changing to food times which require less water (Yes=1, No=2) ☐

4.13.5 Washing clothes at the water points (Yes=1, No=2) ☐

4.13.6 Reduce number of cooking (Yes=1, No=2) ☐

4.13.7 Other (specify),_____) ☐

4.14 What are your **three major coping mechanisms** during water scarcity?

(Travel longer distances=1, More efficient utilization of water=2

Serve uncooked meal=3,Changing to food times which require less water =4,

Washing clothes at the water points=5, Reduce number of cooking=6,

Other (Specify),_____ First Priority ☐

Second Priority ☐

Third priority ☐

Forest resources

4.15 Do you have easy access to forest resources? (Yes=1, No=2) ☐

4.16 If the answer for **Q no.4.15** is **No**, why not?

(The forest is closed=1,Difficult location=2,Other (specify),_____) ☐

4.17 For what purpose do **you** use forest resource?

4.17.1 Fuelwood (Yes=1, No=2) ☐

4.17.2 Food (Yes=1, No=2) ☐

4.17.3 Animal feed (Yes=1, No=2) ☐

4.17.4 Income generating activities (Yes=1, No=2) ☐

4.17.5 Medicine (Yes=1, No=2) ☐

4.17.6 House construction (Yes=1, No=2) ☐

4.17.7 Other (Specify)_____ ☐

4.18 Have you ever collected food items (leaf, fruit) from the forest? (Yes=1, No=2) ☐

4.19 If the answer for **Q No. 4. 18 is Yes**, for what purpose?

(For household consumption=1, For sale=2, Other (specify),_____) ☐

4.20 If the answer for **Q No. 19 is Yes**, who in your household **often** collect?

(Husband=1, Wife=2, Sons=3, Daughters=4, Other (specify),_____) ☐

4.21 Do you use herbs as medicine in your household? (Yes=1,No=2) ☐

4.22 If the answer for **Q No. 4.21 is Yes**, who **often** collect it ?

(Husband=1, Wife=2, Sons=3, Daughters=4, Hearbalist=5,

Other (specify),_____) ☐

4.23 Does your household plant tree? (Yes=1, No=2) ☐

4.24 If the answer for **Q No 4.23 is Yes**, who does **often** the planting?

(Husband=1,Wife=2, Sons=3, Daughters =4, Others (Specify),_____) ☐

4.25 If the answer for **Q No 4.23 is Yes**, who does **often** the watering?

(Husband=1,Wife=2,Sons=3, Daughters =4, Others (Specify(,_____) ☐

4.26 For what purpose does your household plant tree?

4.26.1 Sale (Yes=1, No=2) ☐

4.26.2 Fuelwood (Yes=1, No=2) ☐

4.26.3 House Construction (Yes=1, No=2) ☐

4. 26.4 Other (Specify)_____) ☐

4.27 Who makes major decision on use/cutting of trees? ☐

(Husband=1,Wife=2, Sons=3, Daughters =4, Others=5)

Fuelwood

4.28 What are the **three major source of fuel** for your household? **(Prioritize two)**

(Trees=1,Bushes=2, Agricultural residuals=3, Animal dung=4, Kerosene=5,

Other (specify)_____) First Priority ☐

Second Priority ☐

4.29For what purpose does your household need fuel other than for cooking, lighting and heating?

4.29.1 Sale (Yes=1,No=2) ☐

4.29.2 Small Scale Industries (Yes=1,No=2) ☐

4.29.2 Other (Specify)_____) ☐

4.30 If you use fuel for **Small-Scale Industries**, what is the major activity?

(Pottery=1, Metal work=2, Alcohol processing=3, Other (specify)_____) ☐

4.31 Who **often** collect fuel wood in your household?

(Husband=1,Wife=2,Sons=3, Daughters =4, Others (specify)_____) ☐

4.32 If your children are involved in fuelwood gathering, how old are they?

(7-10 yrs old=1, 11-15 yrs old=2, 16—20 yrs old=3, Over 20 yrs old=4) ☐

4.33 What is the average time spent /round trip fuel collection?

(Less than 1 hour=1, One hour - less than three hours =2,

Three hours - Five hours=3, More than Five hours=4) ☐

4.34 Have you ever reduced energy use due to fuelwood scarcity? (Yes=1, No=2) ☐

4.35 If the answer for **Q No. 4.34 is Yes**, how?

4.35.1 Decreasing the number of meals to be cooked (Yes=1, No=2) ☐

4.35.2 Changing to a food type which requires less cooking (Yes=1, No=2) ☐

4.35.3 Tending fires more carefully (Yes=1, No=2) ☐

4.35.4 Use of metal dish for cooking (Yes=1, No=2) ☐

4.35.5 Other (specify)_____) ☐

4.36 When your household faces with serious fuelwood shortage,

do you cut trees which are not for fuel (Yes=1,No=2) ☐

4.37 How many times is fuelwood collected in your household /week?

(Once a week=1, 2-3 times aweek=2, 4-5 times a week=3, Every day=4, ☐

Other, (specify)_____)

4.38 Does your household sale any wood? (Yes=1,No=2) ☐

4.39 If the answer for **Q No 4.38 is Yes,** what type of wood?

4.39.1 Fuel wood (Yes=1,No=2) ☐

4.39.2 Construction wood (Yes=1,No=2) ☐

4.39.3 Other (specify))_____) ☐

4.40 If the answer for **Q No 4.39.1 is Yes,** by whom is the fuelwood collected? ☐

(Husband=1,Wife=2,Sons=3, Daughters =4, Others (specify)_____)

4.41 If the answer for **Q No 4.39.2 is Yes,** by whom is the lwood collected? ☐

(Husband=1,Wife=2,Sons=3, Daughters =4, Others (specify)_____)

Annex 2 Semi- Structured Questions for Focus Group Discussion

Women's group

Link between women and natural environment (land, forest and water) why?

- What resources are available in the locality (forest, land and water)?
- For what purpose do women utilize these natural resources?
- Is there a difference between the utilization o natural resources by men and women

Natural resource, degradation and management

- What resources are in short supply?
- What problems do women face when they go for water fuel wood and water fetching?
- Is wood trade common in the area? what type of wood by whom, how much does it cost ?
- Is it green or dry trees and branches that people cut for fuel and construction?
- Are the water sources protected from animals and other things? if yes how? and by whom?
- Is water available through out the year?
- Division of tasks in fetching and collecting fuelwood
- Who plant tree in your house hold? who water, who cut and use?
- Men and women's use of forest resources
- Afforestation and soil and water conservation practices, who participate?
- What are the major problems that concern women in the study area?

Men's group

- What are the major environmental related problems in the area?
- What natural resources are available in the area and for what purpose do you use this resources?
- What resources are in scarce supply?
- What are the causes of scarcity and degradation?
- What are the impacts of resource degradation on men, women, children and the community as a whole?
- Availability and scarcity of water, fuelwood and food on women's role

- Women and the link with the natural environment
- Link between poverty and resource degradation

Elders (men and women)

- What changes do you observe between the past years and now in relation to natural resource availability?
- What are the causes of resource diminishing?
- Do you observe changing of gender roles because of natural resource degradation ? if yes what and why?
- What are household responses and coping mechanisms in the past when there is resource scarcity?

Development Agent

- Land use pattern
- Major occupation
- Major crop grown in the area
- Major animals and number
- Major agricultural related problems
- Is there natural resource degradation? if yes what?
- What are the major resources that are degraded?
- What resources are in short supply?
- What do you think is the major causes of natural resource degradation?
- What resource conservation activities are carried out in your area?
- What should be done in the future?

Health clinic

- What are the major health related problems in the area?
- What causes the health problems?
- Who is more affected?
- What should be done?

DECLARATION

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

Name: Hirut Bekele

Signature _____

Place: Addis Ababa University

Date of Submission: May, 2000

The thesis has been submitted for examination with my approval as a University Advisor.

_____

Yeraswork Admiassie (Ph.D)

May, 2000