Living with Adversity and Vulnerability

Adaptive Strategies and the Role of Trees in Konso, Southern Ethiopia

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Doctoral Thesis
Swedish University of Agricultural Sciences
Uppsala 2010

Acta Universitatis agriculturae Sueciae
2010:15

Cover: Photo from the study site showing the farming landscape and communities working in the Productive Safety-Net Program
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ISSN 1652-6880
ISBN 978-91-576-7492-0

Print: SLU Service/Repro, Uppsala 2010

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Abstract

The Konso people of Southern Ethiopia have been known for their traditional land management and conservation practices and mixed farming systems in which trees have played a central role. These practices helped them to sustain livelihoods over long period to survive in a less favored area. However, the Konso people have been suffering from drought and food shortage in the recent past. Despite the long standing traditional land management practices (which are still in use), we do not have sufficient information why the livelihood of Konso people has become increasingly vulnerable. This thesis uses the sustainable livelihood framework to identify potential contributors to vulnerability and also highlights the role of agency and structure perspectives in rural development. The study employed key informant interviews, focus group discussions, a formal survey and a participatory workshop.

The study identified the major factors contributing to vulnerability to be food insecurity from frequent drought primarily as a result of changes in a rainfall pattern, high population pressure leading to reduction in farm size and declining soil fertility. The study also revealed that the options for non-farm and off-farm employment activities are temporary in nature, limited and low paying. Productive Safety-Net Program (PSNP) has enabled people to have better access to food, however, building assets and saving at household level was limited. Conservation and restoration of the natural resources and the building of other public assets under PSNP have showed mixed outcomes. The on-going self-employment credit program is a good start but not adequately in place. The study identified potentials and constraints to tree growing on farm lands as a way to cover immediate subsistence needs, as well as to generate income.

The study concludes that policies that respond appropriately to the Konso-specific context, provide diverse livelihood options, and include the primary social actors and effective coordination and mobilization of local institutions in the decision making process as requisites to enhance the development intervention efforts being implemented to reduce vulnerability.

Keywords: vulnerability, livelihoods, coping strategy, food insecurity, PSNP, farm trees, Konso, Ethiopia.

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Dedication

I dedicate this thesis to my late father Tadesse Eirgete

Contents

Abbreviations

ADLI	Agricultural Development Led Industrialization
CADU	Chillalo Agricultural Development Unit
CSA	Central Statistics Agency
DARE	Deagrarianization and Rural Employment
DFID	Department for International Development
EEA	Ethiopian Economic Association
FFW	Food For Work
FAO	Food and Agricultural Origination
FDRE	Federal Democratic Republic of Ethiopia
FSR	Farming Systems Research
GDP	Gross Domestic Product
IFAD	International Foundation for Agricultural Development
ITK	Indigenous Technical Knowledge
Kanta	Village
PA/*Kebele*	Peasant Association
MDG	Millennium Development Goals
MEDaC	Ministry of Economic Development and Cooperation
NGO	Non Governmental Organization
ODI	Overseas development Institute
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PLA	Participatory Learning and Action
PRA	Participatory Rural Appraisal
PSNP	Productive Safety Net Program
RRA	Rapid Rural Appraisal
SNNPR	Sothern Nation, Nationalities and Peoples' Regional Government Sub-
SSA	Sub-Saharan Africa
SLA	Sustainable Livelihoods Approach
SLF	Sustainable Livelihoods Framework
UNESCO	United nations Educational, Scientific and Cultural Organization

Acknowledgements

There are many people whom I would like to thank for their contribution in completing the research. First of all I would like to express my particular gratitude to my supervisors, Professor Nadarajah Sriskandarajah, Department of Urban and Rural development, the Unit of Environmental Communication SLU, Professor Tarla Rai Peterson, Department of Wildlife & Fisheries Texas A&M University, USA and Dr. Habtemariam Kassa, CIFOR, Ethiopia, for their guidance, intellectual inspiration and encouragement for the accomplishment of the research. Similarly, I am grateful to my former supervisors who were at SLU, Professor Kjell Havnevik and Dr. Neil Powell. I am also grateful to a colleague in my department, Dr. Hans Peter Hansen for the many discussions we have had in recent months and the keen interest he has shown in the progress of my work.

I extend my thanks to Sida, Wondo Genet College of Forestry and Natural Resources of Hawassa University and SLU which supported the study program financially under the cooperation program between WGCF NR/Sida/SLU. In this regard my special thanks go to Dr. Mats Sandewall the program coordinator, and Dr Abdu Abdulkadir and Dr. Melaku Bekele.

My research work could not have materialized without the cooperation and assistance of the farmers of the research sites whom I met and spoke for numerous hours. I thank them for their generous offer of their time and for sharing their knowledge. The Kebele executive committee and the development agents of Debena, Busso, Arfayede, Mecheke and Dera, I thank you for the valuable information and cooperation. Parallel to this, special thanks go to the Konso Bureau of Agriculture and Rural Development for creating a conducive working conditions in particular,

Ato Kora Yaysito, my key informant, and Ato Kefene Tichero, for the administrative support, Konso Development Association and other line ministries. My gratitude goes also to my field research assistants, Ato Karale Kasaso and Ato Gezagen Gelabo. The enumerator, Ato Olado Alo, Ato Garo Kussia, Ato Seyom Godana, Ato Kansite Duba, Ato Solomon Kalita, and Ato Abel Lemita, I thank you very much for your assitance. I also would like to thank Ato Kora Gara and Ato Kuyola Basia for their valuable information about Konso people's historical, social, cultural and economic life, past and present. Ato Kebebew Kapitano, Ato Samuel Negede and Ato Yared Tegegn, I thank you very much for your contribution.

All the staff and colleagues, named and unnamed, at the Department of Urban and Rural Development SLU, I thank you for your direct or indirect contributions. I also would like to thank the Global Natural Resource Management and Livelihoods Research School (NRML), for providing me financial support to attend a workshop. Staff of the Unit of Environmental Communication, Helena, Lars, Per, Vanessa, Christian, Elin, Stina, Hanna, Atakilte, Lotten, Agneta, Elvira, Jenny, Sofia, Sofi and Elnaz, I thank you and it has been an honor and privilege for me to work with you. I thank you, Steve Smith, for English language editing and David Halim, our IT man, for his timely help many times over. In Wondo Genet, I would like to thank the teaching and administrative staff at the College of Forestry for their support throughout the program. PhD students from Ethiopia studying in the same program, the late Abrahm, Yemiru, Abebe and Efrem, and Teddy from Vietnam, thank you very much for your support and friendship.

Finally I would like to thank my family; my wife Mersha, and my children Kidus, Biruk, Alemye and Mititi for the constant support, encouragement and tolerance throughout the period of my study.

1 Introduction

1.1 Background

The Ethiopian highlands offer favorable climatic and ecological conditions for agriculture, and there are many examples of sustaining long-standing agricultural practices. Over 80% of the population, 90% of the agricultural production, and nearly 70% of the livestock that is integrated with agriculture in Ethiopia are concentrated in the highlands ecosystems which cover about 46% of the country's landmass. Lying at an altitude of beyond 1500m above sea level, the highlands are said to be some of the most highly degraded landscapes in Africa, and to have one of the highest population densities in the world (Srivastava *et al.*, 1993).

Agriculture has historically been the backbone of the Ethiopian economy. According to EEA (2004/05) , the percentage share of agriculture was 45% of the country's gross domestic product (GDP), which accounts for about 90% of the total export earning and provides about 80% of the country's employment opportunities.

Given the continuing importance of agriculture to the economic growth and well being of the rural areas, indications are that the natural resources in these areas are continuing to degrade as a result of an increased agricultural dependency and unsustainable usage. The fact is that it has been observed long-ago that the agricultural resource base of Ethiopia has been depleting. Several studies, for instance the Ethiopian Highland Reclamation Study, identified the causes and showed that the agricultural practices have resulted in a progressive loss of soil, consequently resulting in stagnation and/or decreasing crop yield (Hurni, 1989; FAO, 1984). Whether it be at the scale of the individual farm or the whole country, the tendency is to use the best

agricultural land first. When there is a need to increase agricultural production, the chosen path is generally to maximize production in high potential areas. With the land frontier shrinking, future increases in agricultural production will have to be attained through yield increases rather than area expansion. As such, Ethiopia faces the challenge of how to increase current agricultural production while maintaining the future productive capacity of the natural resource base.

Globally, about 47% of the Earth's land area is classified as dryland ecosystems and is home to approximately 2 billion people (Inanaga *et al.*, 2005). In Africa, 73% of the continent's drylands, or 1 billion hectares of land, is moderately or severely degraded (IFAD, 1998; Lean, 1995). Globally, of the 5.2 billion hectares of dryland used for agriculture, roughly 70% is degraded.

Ethiopian drylands cover large portions of the country where considerable amounts of the population derive their livelihoods. Arid and semi-arid areas are mostly inhabited by agropastoralists, with pastoralists accounting for over 50% of the total land area. Semi-arid areas cover a large portion of the lower part of the highlands-low potential zone. The dryland areas in Ethiopia are an important annual crop and livestock production zone, in which 19% of the crop land and 18% of the Ethiopian population is found (Murray *et al.*, 1999). This indicates that Ethiopia is mostly situated within semi-arid to moderate moisture deficit areas. Drylands are characterized by low crop production because of low and unreliable amount of rainfall and repeated droughts. The causes are many and interrelated, and increased poverty has exacerbated the problem. The dry sub-humid, semi-arid and arid zones are the most affected areas during the years of low rainfall and droughts.

In order to reduce the risks often posed by a lack of rainfall, farmers in dryland areas have been diversifying their agricultural practices by harvesting different types of crops and livestock combinations, and by employing different combinations of soil fertility and land management practices. In addition to the diversification and intensification of agriculture, the development of age old soil and water conservation efforts, and a long history of non-farm income activities and migration in Konso are all indicators of adaptation and skill for people who have been living under adverse environmental conditions. This long-standing experience to adapt and survive in difficult situations–as well as the agricultural management strategies being applied and implemented-however, have been increasingly challenged by unreliable rainfall, increasing frequency of drought, population

pressure, depletion of soil fertility and other socio-economical factors, resulting in increased vulnerability and food insecurity in the past three decades.

Rural livelihood takes many forms and number of factors to be considerd. Farmers diversify their income outside agriculture as a survival strategy, particularly in difficult times, in order to reduce general risk and/or to finance farm investments. Moreover, the usage of livelihood analyses in Sub-Sahara Africa (SSA), and the engagement of the rural population within non-farming employment activities tend to be more common in limited agricultural potential areas. This, however, could also be occurring as a response to the risk of crop failure (Kijima *et al.*, 2006; Otsuka & Yamano, 2006; Bryceson, 2002). There is an increasing incidence of non-agricultural income diversification in rural Africa, including Ethiopia. A survey by the Deagrarianization and Rural Employment (DARE) research program that was carried out in six African countries (Ethiopia, Nigeria, Tanzania, Malawi, Zimbabwe and South Africa) found that 60-80% of the household income was derived from non-agricultural activities (Bryceson, 2002). Most recently, Reardon *et al.*(2007), found out that in 2005 the rural non-farm income constituted 35% in Africa and 50% both in Asia and Latin America while the average for Ethiopia was 30% (Otsuka & Yamano, 2006).

Therefore, the income of households-particularly farmers with environmental risk of crop farming and limited agricultural potentials, as well as the landless and the under-employed - can be increased by providing opportunities for engagement in non-farm activities. This implies the potential of non-agricultural income diversification as an alternative strategy in drought prone areas such as Konso, where farmers are unable to maintain a subsistence level from crop farming alone. However, there are different factors that limit the households from engaging themselves in non-farm and off-farm employment opportunities such as resource endowments, as well as their capability and the potential opportunities presented to the individuals. These factors create constraints regarding successful implementation of non-farm income generation activities in the area.

The livelihood strategies of rural households vary, however, most households rely on a range of natural resource uses. Trees are the main resource that diversify and sustain production, while also supplying a farm household with a range of products and contributing to improved food security. The most important and direct contribution of trees to food security is in the form of fruit, medicine, fodder and non-wood products. A

study by Bird & Dickson (2005), in West and Central Africa and South East Asia, showed that their contribution is underestimated and treatment and coverage of the forestry and natural resource issues are generally poor in poverty reduction strategies.

Thus far, the emphasis has been on natural forest management and commercial tree plantation management. The contribution of trees within the agricultural landscape to sustain and support livelihood of the people, however, is less known (Simons & Leakey, 2004). Much of the future increase in food and wood production in the tropics will have to be achieved from existing land resources to meet the needs of increasing populations. Agroforestry is one of the promising options (Ong *et al.*, 2002; Young, 2000). Trees on farm lands have been an integral part of Konso farming in the form of traditional agroforestry systems. Essentially, the products from trees have been used for household consumption in terms of fodder, construction wood, and human food. However, there is a great need to improve tree growing practices in the area, as production from the naturally retained trees on farms are not able to satisfy subsistence use. Considering the increasing demand for construction wood and fruits in the surrounding districts, farmers have shown interest in harvesting these resources as a marketable commodity to contribute to household income. Tree cultivation has some comparative advantages over seasonal crops, for example low labour and capital requirements. Most farm tree-growing activities, however, take place out of subsistence consideration (Schuren & Snelder, 2008).

Considering the discussion above, this study investigates how the vulnerability of Konso's households to drought could be reduced and their livelihoods improved. Vulnerability and livelihoods are not merely an outcome of the biophysical environment. Therefore, the social, economic, and institutional context, as well as the complex relationships and linkages these factors have with the environment, are assessed as they relate to households achieving their livelihoods goals. The Sustainable Livelihood Approach (SLA) and Participatory Rural Appraisal (PRA) methods have been largely employed in this research process. The livelihood analysis is gaining importance as a recent approach to poverty reduction and food security analysis. As discussed by Ellis (2000), it is necessary to bring awareness regarding livelihood more centrally into thinking about rural development. This includes examining livelihood in relation to rural poverty, agricultural productivity, natural resource management (NRM)

and, gender as well as the advancement of policy understandings which recognize the diversity of rural livelihoods.

1.2 The problem statement

Over generations the Konso people have developed traditional methods of land management practices to conserve their valuable soils, moisture and biodiversity. Konso's traditional agricultural system has been intensive and sustainable. Their well known terraces and the intensive agriculture and land management practices, their institutions and the rich culture which was without outside influence until recently were all the cornerstones of the people that helped them survive in a difficult area where droughts are common and extreme poverty exists. The local people now feel increasingly vulnerable than before. They have been continuously supported by relief assistance and Food For Work (FFW) and later Productive Safety-Net Program (PSNP) for the last three decades.

Increasing frequency of drought

Drought and food insecurity coupled with poverty in Konso, appear to be very frequent. Elders of the area remember well the droughts that have occurred in their life since the 1940s. During this period drought was occurring at intervals of approximately every 10 to15 years and now farmers indicated the trend is worsening occurring with a frequency of once every 3 years. Konso was severely affected by a famine which occurred in 1957/1958. The area was then struck by the famine in 1973–74. Following this phenomenon a relief assistance program was started for the first time, and has characterized Konso up to the present time. The 1983–84 period saw the devastating famine which affected almost all of the country. This also coincided with the start of FFW program. Better crop yield was harvested two years after the 1984 drought. Yet, again in 1998/1999 and 2002/2003 the area suffered from drought. Konso has been affected by localized drought almost every three years. With the exception of a 1996 bumper harvest, the years between 1989 and 2004 have generally resulted in reduced crop yield as a result of insufficient rainfall conditions and changes in patterns. Failure of the main rain (which ultimately determines the success of the season's crop harvest) from February to May in 2007/2008, led to a near-complete crop failure for most households in the area. In the current year, 2008/09, drought as in the previous seasons, hit Konso and most of the local farms will produce less.

Socio-economic factors and weakened adaptive strategies

The harsh weather, depleted soils, fragile environment and the growing population pressure have made agriculture less productive and risky, and livelihoods more difficult. In the past, prior to the implementation of relief programs, the Konso people were able to recover from any drought shocks and start fresh without any external assistance. Today, the long-standing traditional adaptive and coping strategies of Konso are more constrained, and the people's material and non-material assets have been eroded due to consecutive droughts and the weakening of their adaptive and coping strategies. Even in good seasons the given land area can no longer sustain the entire population with the agricultural technology presently available to them. One-third of the population appears to be unable to produce enough to feed themselves in good years; with the remainder of the population not necessarily being self sufficient. The other challenge facing the study area is a decreasing supply of trees to be used for household use and market-sale from both the natural forests in the area, as well as local farmland trees.

Constrained income diversification as coping strategy

As a result of the uncertainties surrounding crop production and the inadequacy of the returns to maintain the household for the entire year, non-farm activities and seasonal migration have been an alternative strategy for households in the study area to generate additional income outside agriculture. However, Konso's household livelihood assets have remained very low due to the consecutive effects of drought. The income from such activities is too low to finance farm investment and a great proportion is used for consumption. The fact is that farmers could not even take full advantage of the on-going income generation credit program in the area. Remoteness, low levels of infrastructural services, absence of institutional support, a lack of required skills and social relation issues are among the various constraints that limit the opportunities in the study area.

Development interventions: changing the status quo

Despite the concerted efforts of the government and the aid community through PSNP and other rural development programs to reduce vulnerability and address the problem of food insecurity, much of the situation remains with little change. The number of food insecure households has increased, while crop yield is declining over time. The food security interventions in the area seem to neglect the improvement of the agricultural sector; typically while giving a higher degree of emphasis towards the restoration of communal lands and public assets, and/or income

generation activities. In PSNP much of tree growing is done on communal lands. As such, this also calls for a review of the strengths and shortcomings of the approaches already used by various agencies, as well as the need to adopt a new approach both towards the complex problem of vulnerability and the role of development in risk-prone areas in general.

Without understanding the specific local context and the adaptive strategies and perceptions of various actors, it is not possible to either understand or find solutions that reduce vulnerability and promote sustainable livelihoods. In this study the vulnerability and livelihood issues are explored by identifying the links between the economic, social, demographic and institutional contexts, and how people use these relationships in engaging themselves with the environment while pursuing their livelihoods. Given the increasing frequency of drought that limits annual crop production and the growing demand for construction wood and fruits in the nearby urban areas, this study also pays specific attention towards the role of farm trees in the Konso-context, and their contribution in achieving better conservation and livelihood outcomes.

In summary, this thesis investigates causes which pertain to heightened vulnerability of the Konso people of Southern Ethiopia, focuses on generating a better understanding of the adaptive strategies and coping mechanisms of the community, and investigates the internal dynamics and complexities of livelihoods. Through an investigation from this perspective, this study provides insight into how the development approaches should be rethought to help in the facilitation of more positive impact on the livelihoods of the Konso people. In addition, more generally speaking, such implications could also be considered when investigating vulnerability in other dryland areas in Ethiopia.

1.3 Objectives and research questions

1.3.1 Objectives of the study

General objective

The aim of the study is to gain an improved understanding of the vulnerability contexts and adaptive strategies of people in drought-prone semi arid areas.

The specific objectives of the study are:

To examine the socio-economic profile, the asset base and the vulnerability context of people in Konso.

To study the adaptive strategies of households and communities and how these have evolved over time.

To investigate the importance and role of trees in the farming system and the changes with time.

To assess the intervention measures that are being taken by the government and other actors to reduce vulnerability, and to explore their impacts on livelihoods and on the resource base.

To explore the role of local institutions in natural resources management and social support during drought years and how this role has changed over time.

To identify issues that require the attention of key stakeholders (e.g. policy makers, local government, researchers, NGOs, researchers) so that interventions in the future could have better and positive impact on livelihoods and on the resource base.

1.3.2 Research questions

In view of achieving the stated objectives, the study focused on the following research questions;

What is the socio-economic profile and how has the vulnerability context of people in Konso changed over time? What are the causes?

What adaptive strategies are being used by the communities? What measures are being taken by the government and other actors to reduce vulnerability, and how effective have these strategies and measures been?

How has the role of trees in the farming system changed over time?

How can these strategies be rethought for better and positive impact on livelihoods and on the resource base?

How has the role of local institutions changed over time in promoting NRM and in reducing vulnerability of people?

The problems pointed out in the previous section indicate in my view, that there is a need to better understand the contextual features. These features will enable us to more clearly visualize the actual processes, actions, visions and potentials in view of the local environmental, socio-economic context and adaptive strategies that the community is applying in an effort to achieve their livelihoods objectives. The results of this study provide insight into the vulnerability context, and people's response within this context. The study also provides insight into how on-going development interventions need to be based on the realities of the Konso, and need to combine local perspectives and experiences (adaptive and coping strategies), as well as the provision of adequate space, for informal institutions to respond effectively and promote sustainability. The contents of the remaining chapters are presented in the next section.

1.4 The thesis outline

The thesis consists of nine chapters.

Chapter 2 discusses the conceptual and theoretical approaches used and lays out the main research questions which guide the study and its methodological considerations. The theoretical perspective is constructed with combination of SLA, PRA and the agency-structure theory. The combined approach helps to embrace contexts, involve local people and explore local explanation and understanding in order to follow how local people construct livelihood practices in the natural, economic and social environmental settings in which they live.

Chapter 3 presents the methods used. The actual field work started with a pilot study. Repeated field visits with extensive formal and informal discussions were conducted with individual and groups in the study area. Local explanations on contexts, vulnerability, and livelihoods strategies, etc. were discussed. Predominantly, much of the information was qualitative – obtained by applying PRA tools-but quantitative data collection was also employed through a formal survey.

Chapter 4 describes the socio-economic profile and vulnerability context of the study area, focusing on assets particularly with respect to natural capital. This is in line with the concepts of the Sustainable Livelihood Framework (SLF). This chapter also provides an account of the vulnerability context and an overview of the drought occurrences. A brief historical account is presented, and the farmers' perceptions of major causes of vulnerability are also explained as an interaction of environmental, economic, social and demographic factors

Chapter 5 presents the main context of the study and attempts to derive a more clear understanding of the adaptive and coping strategies to changing environmental and socio-economic conditions. Of particular importance are the household and community level. The adaptive and coping strategies to reduce vulnerability to drought such as conservation and agricultural intensification and other farm-related strategies and non-farm adaptive and coping strategies, trends and their implication have also been explored. The study also shows that farming remains to be the main source of livelihood for

many local people, but its improvement has been neglected by development interventions. This section also discusses more specifically the use of trees as adaptive strategies.

Chapter 6 presents the intervention efforts that have been undertaken in the study area to reduce vulnerability and improve food security. The overall purpose of this chapter was to provide an overview of the types, appropriateness and impact of interventions sought to support Konso's livelihoods. The chapter emphasizes the development and food security intervention implemented by PSNP as it relates to natural resource conservation and other income generation programs which are aimed at community and household asset maintenance and building. The chapter also discusses the role of tress as a part of the interventions program.

Chapter 7 reviews the current status of local institutions and examines their interaction with formal institutions. It briefly assesses the local institutional context, functions, strengths, weaknesses and constraints, and suggests strategic considerations as to how they should be best integrated in the development interventions within Konso's context. Konso is good evidence of the common values the people and the local institution share in resource conservation. Presently there is limited integration between the communities and local institutions regarding development efforts.

The final two chapters, chapter 8 and 9, bring together the implications that these findings have regarding the communities within Konso and their challenges of living with adversity and vulnerability and draw conclusions about Konso and beyond, as well as some additional issues of concern.

2 Theoretical considerations

2.1 The sustainable development concept, sustainable livelihoods approach and agency - structure

2.1.1 Overview of development approaches

This section begins briefly by reviewing historical paradigm shifts and their subsequent implications on conceptual, methodological and practical aspects of sustainable development. It also discusses SLA, and investigates the usefulness of agency and structure insight into rural livelihoods in particular and sustainable development in general.

In science, a paradigm is considered as the general convention of thought that governs a discipline. According to Rapley (2002), a given paradigm dominates the field and sets the debate within that discipline during a given period of time. Eventually the weight of evidence for the weakness becomes too great, the old paradigm collapses, and a period of ferment follows, in which a relative state of unrest unfolds and the search for a new paradigm begins. ODI (2002) and Ellis & Biggs (2001) have documented major paradigm shifts and approaches to rural development thinking since the 1950s. They have noted that ideas which first appear in one decade often gain strength in the following decade, typically beginning to affect rural development practices in a widespread manner ten to fifteen years after they were initially suggested. For example, with regards to the SLA, the concept first appeared in research literature in the 1980s, while ultimately taking effect in the late-1990s.

The first 'paradigm shift' in rural development occurred in the early to mid-1960s period, when small farm agriculture switched to being considered as the engine of growth and development (Ellis & Biggs, 2001). During this period, due to poor uptake of technology transfer, the diffusion of technological innovations model emerged based on the principle of "we know the problem and the solutions". To elaborate with an example, the Chilalo Agricultural Development Unit in Central Ethiopia in the late-1960s was designed to improve agricultural production of the smallholder farming community and contained community development components. Subsequently, in the 1970s, it was realized that the communities and their environment were diverse and more complex than originally perceived; resulting in a demand for a more complex and thorough analysis of the situation. This led to a second 'paradigm shift' that brought change in rural development thinking in the 1980s and 1990s, and resulted in a new attitude for overcoming stereotype thinking towards rural development. In retrospect, this shift can be viewed as a turning point in rural development approaches because earlier strategies were unable to bring desirable changes in rural areas, and ultimately resulted in the requirement for a shift of ideas (Ellis & Biggs, 2001; Chambers, 1997). This revised approach advocates that the point of departure should be participation, trust and dialogue with the community. That is, it takes into account the principle that the communities themselves know what is best for them. This shift considers that people themselves should be the 'owner' of the problem definition, should be provided the opportunity and responsibility to analyse and determine their needs, priorities and capacities rather than an outsider. This does not mean, however, that outsiders and development practitioners have no role in the development processes. Rather, a bottom-up, process-oriented approach has been sought after to replace the (historically applied) top-down, or 'blueprint', approach to rural development. This revised approach envisages rural development as a participatory process which should empower rural communities to take control of their own priorities for change and development.

It is also in this period that several converging approaches emerged (e.g. the Farming Systems Research (FSR), Indigenous Technical Knowledge (ITK), and Rapid Rural Appraisal (RRA) processes, as well as participatory methods such as the Participatory Rural Appraisal (PRA), Participatory Learning and Action (PLA), empowerment and actor approaches) and developed in order to help overcome research and policy challenges facing

sustainable development. It was in this period that the SLF emerged as a guiding principle for rural development practice.

In the recent past, the creation of an enabling environment has been given more emphasis as a pathway for more effective sustainable rural development. As a result, institutional/ structural arrangements, and processes such as laws, regulations, and policies, have been transformed and implemented in cross and multi-sectoral development activities. Some of the more recent measures that are being taken to promote sustainable rural livelihoods include: liberalization of marketing, rural financial services, decentralization, diversification, small enterprise development, capacity-building, as well as new policies for macro-micro (and sectoral) linkages and structural adjustment programs.

Paradigms tend to shift from one to another when their application becomes questionable based on their impact, or when they become ideologically or politically undesirable. Approaches to development are continuous processes and are necessary for the continued development of societies. As a result, the way of thinking and dealing with problems-as well as the practical and appropriate measures to solve them-are also required to be changed continuously over time.

2.2 Agricultural development and the growing concern of sustainable development

Since the 1960s, with the advent of improved agricultural technologies, there has been considerable achievement in improving agricultural production and human development indicators. The success stories which appeared in the 1960s (and subsequently) raised concerns and debate regarding the impact of development on environment. The realization of the limitations of the biophysical environment in sustaining human society in a long-term perspective, as well as the application of technologies that are not environmentally-friendly, has led to much debate pertaining to the relationship between environment and development The interdependence between development and the biophysical environment has been widely accepted, and has called for a new solution widely known as "sustainable development". Cairns (1997) described two ways to respond to limits: the first is to deal with the consequences of exceeding limits as they are encountered; the other is to adjust behavior now to preempt the unpleasant consequences of exceeding limits to growth. The types of preemptive

adjustments that may be necessary are the main focus of the sustainability concept.

As reported by the World Commission on Environment and Development, Brundtland (1987) defined sustainable development as "the ability of humanity to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainability has become a commonly used term that can be applied to many kinds of activities; environmental, commercial, industrial, economic, recreational, etc. With regards to rural development in particular, the sustainability concept–and its application-frequently appears in the agriculture and economic development sectors; often being central within the debate regarding economic development and environmental management. Sustainability has been interpreted and defined in many different contexts and perspectives, but most definitions appear to have similar meanings and revolve around the Brundtland report. The exercise of this definition is one useful way to examine several perspectives and to understand competing views, but we do not necessarily subscribe the need to define sustainability in order to practice it (Gibbon *et al.*, 1995). This suggestion, however, is argued by Bell & Morse (1999) who suggest that unless we know clearly what we are trying to–that is, what sustainability implies and what we are trying to get from it-we cannot develop it.

Considering the uncertainty over the meaning of the sustainability concept, as well as the popularity of its use and application, Bell & Morse (1999) note that the underlying reason for unclarity towards the concept is that it has been interpreted in many ways and in different individual contexts (i.e. political, economical, environmental values etc). Likewise, Campbell (1994) (as quoted in Pretty (1995), suggest that an "attempt to define sustainability misses the point that, like beauty, sustainability is in the eye of the beholder… It is inevitable that assessment of relative sustainability are socially constructed, which is why there are so many definitions".

The debate on sustainable development is not only with regards to the definition, but its application. Some doubt whether it is an operational concept or an attainable objective; some do not think that it is possible to construct an adequate measure of environmental degradation in order to evaluate development polices due to long-term or widely dispersed effects on the environment (Rapley, 2002). Other arguments include who determines what is being sustained and is not, for how long, for whose

benefit and using what measurement criteria and time horizon (Pretty, 1995). The debate continues to attract several different disciplinary approaches and perspectives. The argument on the concept has been continuing while approaches to sustainability continue to evolve. Ehrenfeld (2008) and Pretty (1995) observed that since the concept of sustainability is complex and contested, or that it can be viewed as a continuing process, the authors suggest that rather than trying to define the term, it would be easier to agree on particular goals.

Sustainable development calls for not only maintenance of environmental resources but also an appreciation of the close links between the environment and society, a better understanding of environmental processes, and the recognition of humans' decisions regarding the rational use of basic environmental resources (Hopwood *et al.*, 2005; Folke *et al.*, 2002). Such an approach in the study of environmental resources is believed by researchers and the academic community to be methodologically-sound approach in addressing the interactions between social, economic and natural processes. Furthermore, sustainable development should be regarded as a process of making informed trade-offs in balancing competing social, economic, and ecological objectives. Bearing these complexities in mind, it is a challenging and demanding task to integrate all the various forms of scientific knowledge with respect to the issue, as well as to present unbiased evidence for policy formulation that is both socially and environmentally acceptable.

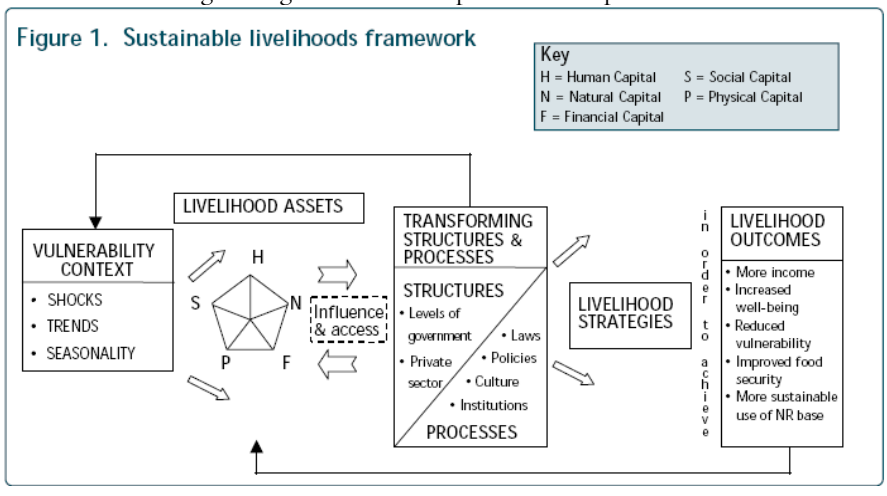
In conclusion, an overview of the sustainability subject can be grouped into three bodies of work. These three bodies must be taken into account in development theory and practice. First, an economic point of view should be considered which takes into account that sustainable growth needs to be achieved through sustainable development. Second, there must be consideration of the ecological premises which take into account the limits of natural environmental growth. And third, there must be an inclusion of the social and institutional dimensions within the perspective, with a focus on social inequality; particularly when addressing sustainable development in developing countries. The vital concept behind sustainability is the notion that the interrelationships between these components help us to understand the nature of the problem. This is vital to understanding the processes involved in facilitating solutions. It should be noted, however, that often great difficulty lies in achieving economic development which is coherent with environmental and social goals.

It is with this understanding that the SLF emerged in the 1990s, in response to the failure of development interventions to appropriately conceptualize the cross-scale and complex economic, social, ecological and behavioral choices confronting (predominately) rural and agricultural producers (Carney, 1998; Scoones, 1998; Chambers & Conway, 1992).

2.3 The Sustainable livelihoods approach-scope and limitations

The concept of the SLA, which first appeared in research literature in the 1980s, has been adopted by the Department for International Development (DFID) since the 1990s as a part of the United Kingdom development policy, and has been the basis for a number of DFID programs and practices (Solesbury, 2003; Ellis & Biggs, 2001). Being one of the Millennium Development Goals (MDGs), the core aim of the SLA is to contribute to international development efforts in tackling the underlying causes of poverty. As a central goal towards development efforts, the framework supports poverty eradication by creating sustainable livelihoods for poor people through improved understanding of their livelihoods (Farrington *et al.*, 1999). As shown in Figure 1 the framework draws on vulnerability contexts (shocks, trends and seasonality), assets (natural capital, physical capital, human capital, financial capital and social capital), transformation structures and processes (markets, institutions, organizations, norms and cultures, policies and laws), livelihood strategies and desired outcomes which affect poor people's livelihoods. The framework also takes into consideration the typical relationships between these factors.

Figure 1. DFID Sustainable livelihoods framework, adopted from www.livelihoods.org/info/guidance-sheets-pdfs/section2.pdf



A livelihood is defined as the set of strategies employed by individuals and households to make or gain a living, as determined by capabilities, tangible (e.g., natural resource, human, physical) and intangible (e.g., claims and access relationships) assets (Chambers & Conway, 1992). Livelihoods in many rural areas of the world are complex, interdependent and dynamic: perhaps the one constant is the day-to-day uncertainty of survival. De Haan & Zoomers (2003) as cited in (Marschke & Berkes, 2006), elaborate by suggesting that the concept of livelihood is about individuals, households, or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, and responding to new opportunities. Livelihoods are an emergent outcome of multiple socio-economic, institutional and ecological drivers interacting across varying scales. Rural livelihood dynamics are linked not only to agricultural production, but also to wider institutional settings. Property rights, ethnicity and class, and local resource control are just a few of the factors that shape local livelihoods and create vulnerabilities for individuals engaged in adaptive co-management (with respect to both external and internal forces) (Plummer & Armitage, 2007). The sustainable livelihoods approach provides increased understanding on how communities and rural groups organize and mobilize resources in relation to their ideas and values, and in response to external policies and strategies (including development assistance) (Havnevik *et al.*, 2006).

The sustainable livelihood approach has since been adopted by a range of development actors (e.g. bi-lateral and multi-lateral banks and development agencies), and provides a reasonably coherent framework for evaluating linked socio-economic outcomes associated with adaptive co-management (Plummer & Armitage, 2007). More recently, the idea of complexity and resilience has been given attention in the sustainable livelihood approach and are increasingly being emphasized (Barrett & Swallow, 2006; Adger *et al.*, 2002).

The SLF provides an analytical structure that is useful in reconciling complexity and interconnections between socio-economic and governance aspects (Plummer & Armitage, 2007). The framework is essentially an integrating device, helping to form and bring together different perspectives on these facets. With this recognition, the framework can be used in new project or program designs, as well as providing the capability for monitoring and impact assessments of on-going or completed activities. It can improve the design of interventions in several ways: (i) by identifying what information is needed for making sound decisions; (ii) by identifying different interests between stakeholders (particularly poor groups) that need to be taken into account; (iii) by emphasizing links between the local and policy levels; and, (iv) by enhancing cross-sectoral coordination (Farrington *et al.*, 1999).

There are, however, some criticisms of the SLF within the livelihoods literature. Typically, these criticisms revolve around the special attention paid to assets and vulnerability issues (Ellis, 2000; Ashley & Carney, 1999). Much of the criticism stems from the field of political economy and politics related to power relations. For example, the 'transformation structures and processes' (e.g., policies and/or institutions) that influence livelihoods are identified in the framework but they are under-emphasized. Also, it has been suggested that the power relations that influence those structures and processes, as well as access to and utilization of assets, are not explicitly addressed, and that the framework is also, to a great extent, micro-focused (Farrington *et al.*, 1999).

Furthermore, institutions, policies and laws, and how rural people perceive and experience them, may not be fully grasped and discussed within the framework, as local people may not have full knowledge or experience of externally generated arrangements (Havnevik *et al.*, 2006). Broadening of the governance issues as part of the framework is a critical factor in order to

provide a broader scope for explaining rural development dynamics. Others have commented that the livelihood analyses are not explicit in terms of the dynamic ecological and social context in which they are embedded. In this regard, through an analysis of case-studies of sustainable livelihoods-oriented development interventions, it has been suggested that the question of power-relationships is both the critical link and barrier, as it structures the ways in which people have a voice at the micro-level, how much room partners have to maneuver, and which policies are adopted at the macro level (Toner & Franks, 2006). These authors also suggest that the concepts of 'ownership', 'participation', 'empowerment' and 'partnership' need to be worked with greater emphasis critically in relation to the exercise of power in all stakeholder relationships.

A conducive policy environment is one of the necessary requirements for improving livelihoods while managing the natural resource base in a sustainable manner. Baumann (2000) argues that politics and power relations should be incorporated into the framework as "political capital". The author stresses that if we recognize that politics play a fundamental role in causing poverty, a failure to deconstruct power relations can also render the framework inaccurate. Thus the sustainable livelihoods framework idea has evolved from a need to expand (i.e. with a focus on assets and capabilities) towards allocating more emphasis on social capital in the areas of rights, power and governance (Carney, 2003).

2.4 Brief review of livelihoods study in Africa

The central objective of the livelihoods approach has been to search for a more effective method to support people and communities in ways that are meaningful to the lives and daily needs of individuals, as opposed to ready–made intervention instruments (Leo de Haan, 2005). In this regard, recent empirical studies in Ethiopia, and other areas in Africa at large, show that there is increasing evidence that the rural communities depend not only on agricultural livelihood systems; rather, income from non-farm and off-farm employment is also a very important activity to livelihoods. These empirical studies have shown that farmers are actively participating in non-farm and off-farm employment; with some deriving a considerable proportion of their income from this participation, and others doing so just to supplement household livelihood needs.

The majority of studies have been conducted in an effort to study livelihood diversification patterns and establish insight into the livelihoods of the local people. Most of the literature focuses on diversification of rural livelihoods, and follows a conceptually-similar role of reducing dependency on food crop production and (thereby) reducing poverty (Barrett *et al*., 2001). Based on a study on two agro-ecological sites in the Hararghe Highlands of eastern Ethiopia, Tefera *et al.*(2004) reported that 60% of the households participated in non-farm activities. However, the households have been engaged in these activities mostly as a supplement to bridging insufficient farming income. In addition, the rate of participation in wage labour was higher among the poor households, while the wealthy households (i.e. in better agro-ecological sites) were involved in more remunerative activities such as trade. The study also showed that, while cash crop growing generally facilitates intensification of staple food crop production, 53% of the households do not have sufficient food to meet household needs. The authors concluded that rural households are different in their resource endowments, and suggested that interventions to support sustainable rural livelihoods must take into account diversity in terms of resource endowment and in livelihood strategies.

A study by Carswell (2002), which was based on livelihoods in the southern part of Ethiopia, found that in areas of intensive agriculture, income from non-farm activities is higher mainly with respect to the wealthy categories, while in areas with extensive dryland agricultural systems the wealthiest categories obtain their income mainly from farming. In the study area, income from non-farm and off-farm activities accounted for 44% of the cash income. Moreover, contrary to the generally perceived opinion that diversification predominantly open to men, the study found out that women diversify more than men - mainly with respect to trading. Woldenhanna & Oskam (2001) found that as off-farm wage employment decreases, off-farm self-employment increases with increasing farm output and decreasing family size eventually leading farmers to participate in off-farm self employment activities.

A study by Holden *et al.* (2004) however, which focused on non-farm income and household welfare in agriculturally less favored areas in the central highlands of Ethiopia, came up with a contradictory finding. The authors showed that better access to non-farm opportunities decreases farming activity; thereby leading to a reduced care towards farmland

conservation and management reducing agricultural productivity, and resulting in the households becoming net buyers of food.

Theoretical and empirical studies which have focused on the adoption of tree growing have identified several biophysical, economic and social variables. To elaborate slightly, the biophysical factors include aspects such as soil fertility, slope, farming and land use system; the economic factors include aspects such as financial assets, resource endowment in land, labour and savings; and the social factors include aspects such as formal and informal institutions and markets. A study in India by Sood & Mitchell (2009) and one by Holden & Yohannes (2002) which was undertaken in southern Ethiopia, found that large farm size as an important factor that increases the probability of on-farm tree growing, since farmers in these areas can bear the risk of growing trees on their farms. Another study in northern Ethiopia by Jagger & Pender (2003) showed that the costs and rate of return, as well as the opportunity cost of land are major determining factors when trees are grown on croplands. A study in Cameroon by Degrande *et al.*(2006) showed market access as amongst the most important factors determining tree growing choices. In a long-term perspective, tenure insecurity has often been cited as a limiting factor for investment in land improvement and tree growing. Holden & Yohannes (2002), however, have concluded that land redistribution and tenure insecurity has no significant effect on undermining investments to tree growing; instead, resource poverty in land, livestock and education are the factors which hinder tree growing on farms. Similarly, Deininger & Jin (2006), noted that transfer rights are indeed explicitly investment-enhancing; however, the current tenure insecurity has less of an impact on tree growing because farmers see growing trees as a way of enhancing tenure security. Contrary to these findings, based on a study conducted in three Regional States, Bekele *et al.* (forthcoming) concluded that the tree planting activities of Ethiopian farmers is very much restricted to homesteads where ownership is more secure.

It should be noted, however, that most of these studies focused on one of the three rural livelihoods strategies: (i.e. non-farm diversification and income) and placed much emphasis on financial and physical resources. A one-way focus on livelihoods leads to an incomplete understanding of the complex livelihood strategies of the poor. Consequently, interventions designed on such bases may not fit well into the realities of the situation. Material assets should not be considered the only component comprising livelihoods within a rural community. Rather, the beneficial effects of

diversification depend upon both material and social attributes which provide diverse opportunities. The availability of these attributes could be constrained by local conditions and policy environments. As such, rather than viewing livelihood diversification as merely being associated with financial and physical resources, both the tangible resources and non tangible assets need to be considered in order to widen livelihood options and opportunities.

Rural livelihood activities are multidimensional phenomena influenced by complex and interrelated environmental, economic and social issues: for example, context-specific institutional factors. Livelihoods should be studied to uncover these complexities in a participatory and integrated manner which takes into account the dynamic context of rural development in order to achieve sustainability. The literature shows that livelihood diversification is more occasional, and typically relies quite heavily on low-return opportunities for the majority of the farmers. The literature does not sufficiently address how diversification should be developed into more proactive responses such as adaptive strategies which could be helpful in reducing vulnerability from a long-term perspective. Income diversification is useful in poverty reduction, however, there is a danger in assuming uniform benefits from any policy or program that seeks to expand non-farm employment opportunities (Block & Webb, 2001). Therefore, if a stronger support is needed to enhance diversification and promote alternative rural livelihoods activities, a more holistic conceptualization of rural dynamics is required for policy derivation.

In the literature, a farmers' choice to grow or not grow trees on their farm land is presented with a greater focus towards providing a quantitative assessment that identifies a number of interrelated biophysical and socio-economic factors that influence this choice. However, decision-making processes require an in-depth qualitative assessment to give plausible explanation for the observed quantitative patterns. One determining factor to tree growing in a given area may be less relevant to other areas; suggesting the need to identify area-specific constraints to tree growing. As such, support polices should consider existing resources, as well as the capacity and needs of farmers with varied resource endowments.

Therefore, understanding livelihood diversification, the examination of factors that determine on-farm tree growing, and the exploration of other livelihood components are a closely interrelated theme. This study sought to

explore these factors in an integrated manner. The study adopted the SLF with due recognition of its limitations and complementing it with the agency and structure relation in order to get a more detailed picture. This is discussed in more detail in the following section.

2.5 Linking the sustainable livelihood framework and agency and structure relation in livelihoods analysis

2.5.1 The concept of agency and structure relation

Agency refers to an actor's or group's ability to make purposeful choices, i.e. the actor is able to envisage and purposively choose options (Alsop *et al.*, 2005). This is related to the behavior of individuals and collective actors' power to make decisions and carry out purposeful action in response to challenges they are faced with during the course of their lives. Even when people have the capacity to choose options, they may not be able to use that agency effectively as they are constrained by structure. When it is said that one has agency, it is suggested that one can make choices or make a difference in an outcome. Agents are socially constructed, influenced and modified by the context of the agency action; as well as the socio-cultural, political and economic structures that are continually interacting to effect change within the structure. Structure on the other hand is defined as those aspects of an institutional context within which actors operate and the factors that influence their ability to transform agency into action (Alsop *et al.*, 2005). Structures contain certain normative rules/institutions, policies, values, culture, social practices and norms in which the agency operates.

The conceptualization of agency and structure relations in livelihoods allows for a systematic consideration of the complex interactions between various factors (i.e. both the material and non material assets of communities), and the ability to capture the impacts and implications between them when individuals are engaged in pursuing different forms of livelihoods. It helps in understanding how agents seek opportunities and struggle to make living amid structural constraints, and provides better insight into power relations and its influence on livelihoods assets, food security, vulnerability, and marginalization, as well as how the policy and institutional environment affects different segments of the population. All of these factors change over time and interact with each other through a complex set of relationships. Agency and structure theorists suggest that social agents are inherently socialized and that the actions of agents are informed and shaped by social

structures such as norms and institutions that are prevalent in the society in which they are socialized. On the other hand, following the notion that humans are generally free to behave, think and choose, the actions of actors - be it individually or collectively - may alter and shape social structures such as norms and institutions. This too could be a central point with regard to agency and structure.

The agency and structure approach sees the processes and structure components of the SLF as the key to understanding the way people cope with hazards and survive vulnerable livelihoods. As a livelihood analysis is complex and contextual, identification and understanding of politics and power should be examined through the agency and structure perspective in order to aid in the determination of opportunities and constraints. In this light, this study adopted the SLF (which integrates the idea of agency and structure) in order to examine patterns of vulnerability, identify and define the major causes of rural vulnerability in dryland agro-ecology. The ultimate goal is to aid in establishing and informing decision making aimed at enhancing livelihood resilience. The study area is highly vulnerable to natural hazards; particularly with respect to erratic rainfall and declining land productivity. But what makes the study area different is the frequency of drought, and its marginality in terms of crop production and increased vulnerability of the communities.

2.5.2 Understanding vulnerability using the sustainable livelihood framework and the agency and structure concept

The SLA provides a framework to identify existing assets and strategies available to people. The approach uses these facets as a starting point while keeping the focus on people. It also helps to identify how sector-specific development interventions could fit into the wider livelihood objectives. This study used the SLF as an organizing tool to establish a better understanding of the vulnerability of Konso farmers and their adaptive strategies. Issues regarding the overall livelihood assets (but with more of an emphasis on the natural, human and social aspects), adaptation strategies, food security, agricultural production and policy, and the institutional environment were considered against the backdrop of continuing drought; which is the key factor in determining the vulnerability of households within the study area. A vulnerability analysis provides a starting point for the determination of an effective means of promoting remedial action to limit impacts by supporting coping strategies and facilitating adaptation (Kelly & Adger, 2000).

Vulnerability is the state of susceptibility to harm from exposure to stresses associated with undesirable environmental, political, economic and social changes, and from the absence of capacity to cope (Adger, 2006). The stress to which a system is exposed, its sensitivity, and its adaptive capacity are the key parameters of vulnerability. This means that the ability to recover is determined by physical, environmental, social, economic, political, cultural and institutional factors. Whatever the differences in approaches to vulnerability, it is a multi-layered and multi-dimensional social space defined by the determinate political, economic and institutional capabilities of people in specific places at specific times (Watts & Bohle, 1993). In this sense, a theory of vulnerability should be capable of mapping both historically-and socially-specific realms of choice and constraints (Watts & Bohle, 1993). Vulnerability has two sides: an external side of risks, shocks, and stress; and an internal side, which is defenselessness, which implies a lack of means to mitigate or cope without incurring losses (Chambers, 1989).

Vulnerability and resilience have common elements of interest-the shocks and stresses experienced by the social-ecological system, the response of the system, and the capacity for adaptive action (Turner *et al.*, 2003). Vulnerability can be, in other words, defined in terms of *exposure, capacity* and *potentiality*, meaning the susceptibility of assets to risk . Accordingly, the prescriptive and normative response to vulnerability is to reduce exposure, enhance coping capacity, strengthen recovery potential and bolster damage control (i.e. minimize destructive consequences) via private and public means (Watts & Bohle, 1993). The other dimension of vulnerability is social vulnerability. This dimension relates to the exposure of groups of people or individuals to stress as a result of the impacts of environmental change. When considering social vulnerability, the role of the human system-viewed in terms of physical and biological variables–is taken as the most relevant factor to livelihoods and how the community and government is organized to manage important physical, material and non material resources to protect them from vulnerability. These aspects include formal political structures and informal systems by which people get things done. Social vulnerability generally encompasses the disruption of a groups' or individuals' livelihood(s), loss of security and forced adaptation to the changing physical environment (Adger, 2000). For vulnerable groups such stresses are often pervasive and related to the underlying economic and social situation, in terms of a lack of income and resources, as well as war, civil strife and other factors (Chambers, 1989).

In recent times, with consideration given to the climate change issue, sustainable development has begun to include and link to the subjects of vulnerability, adaptation and livelihoods. This has been accompanied by the development of a variety of approaches to analyze situations, initiate development interventions and assess the potential impact of the approaches. The vulnerability context of the SLF describes the environment in which people live. People's livelihoods and the wider availability of assets, as well as the wide range of dynamic external forces that influence people's livelihoods, are fundamentally affected by critical trends as well as by shock and seasonality-over which they have limited or no control (Reenberg *et al.*, 2008). Sources of vulnerability include environmental, political, policy and socio-economic uncertainty and conflict. Transforming structures and processes influence the vulnerability context; which in turn affects the asset of households. An assessment of vulnerability, then, requires an analysis of the political economy and an examination of the structures of institutional constraints (Kelly & Adger, 2000).

Much of the literature supports the SLF, as it provides a useful conceptual base for understanding vulnerability and the situation of people living in rural areas, and it is also an effective tool for analyzing the impact of vulnerability on their livelihoods. The framework can also be used to analyze the coping and adaptive strategies pursued by individuals and communities as a response to external shocks and stresses such as drought, flood and unfavorable policies. In this study, a people-centered (or agency-led) perspective of the livelihood approach which also includes an analysis of structural constraints is recognized, as close links exist between the two perspectives. The agency-structure relationship is considered to be an appropriate way to tackle institutional and structural issues including marginality and power in a more detailed way.

2.5.3 Household asset portfolios considered in the study

The vulnerability context has a direct bearing on the hardships that people face. The fragility of poor peoples' livelihoods leaves them less able to cope with trends and shocks. Because they have limited assets, they are also less able to take advantage of positive trends. Understanding the asset status of individuals or households is fundamental, because asset status of households determines how vulnerable they are to shocks, as well as their understanding of the options available to them. Resources and livelihoods are inter-linked, and this relationship determines the type and direction of outcomes resulting

from various interventions. Livelihoods rarely refer to a single activity but rather to a complex web of activities and interactions that emphasize the diversity of methods developed by households to make a living (Scoones, 2009). Diversity and dynamics are crucial to ensure livelihood sustainability. As such, the sustainability of livelihoods has often been associated with the concept of vulnerability when dealing with poverty and famine shocks (Devereux, 2006; Start & Johnson, 2004; Devereux, 2001).

The SLA seeks to bring together important factors that affect the vulnerability or strength of individual (and/or household) adaptive and coping strategies. The strategies regarding how to change the assets or resources into livelihood outcomes, in turn, are conditioned by the vulnerability contexts in which they live, as well as by the opportunities created and the constraints imposed by economic, social and institutional elements (Jafry, 2000). Viable livelihoods, resources and responsive institutions are conceived to create capacity in order to respond easily to vulnerability (Adger *et al.*, 2002). Livelihood resources determine the ability of individuals, households or a community to follow different livelihood strategies, and practices of resource management are profoundly influenced and shaped by the environmental realities that exist, the socio-economic conditions, as well as formal and informal institutional processes.

An analysis of the asset portfolio of communities provides a useful starting point in efforts aimed at understanding how-and in what combinations-assets translate into sustainable livelihoods (Carney, 2003). In addition, looking at the multiple natures of these assets helps to provide the opportunity for a holistic approach to livelihoods; which, in turn, brings out some of the strengths that exist even among the poorest members of a community. In other words, the sustainable livelihoods framework begins from the premise that target groups have strengths. These strengths constitute the starting point and are a core component of the empowerment processes (Carney, 2003). Alsop *et al.* (2005) state that action to enhance empowerment, or a person or group's agency, can be largely predicted by their asset endowment, and more specifically, by range and interaction between the different kinds of assets.

Vulnerability is further rooted in a deep tangle of institutional and structural constraints which include the access to livelihoods, i.e. a political economy context (Wisner *et al.*, 2004). Policies and institutions determine who gains

access to what assets, the effective value of the assets gained, and which livelihood strategies are open or attractive to pursue.

The natural resource capital

Access to natural resources is treated as one of the assets among several kinds of capital. The SLA integrates natural resources into the framework for analyzing how people use them to make a living. Natural capital is made up of natural resource stocks (land, water, forest, genetic and other environmental resources) from which resource flows useful to livelihoods (Carney, 1998). Direct access to-and the use of-natural capital is, in many respects, more significant to the rural poor. Furthermore, it is the basis for all human economic activity and well-being. The environment is a key in any rural development thinking, and erosion of this asset means limiting options and increasing vulnerability of its users. Within the SLF, the link between assets (and, in particular, natural capital) and the vulnerability context is strong. The issues of resilience and vulnerability are likely to become more important in the framing of natural resource management questions, as they provide a bridge between the analysis of institutions and economies with the natural resources in which they ultimately depend upon (Adger, 2000). In policy-terms, these issues are also useful since both ecological stability and resilience are perceived as desirable social goals.

The human capital

Human capital, that is, the skill and capability status of a population, are important for knowledge-based development. Dercon (2004) clearly states that the initial level of income, including investment rates in human and physical capital, are essential building blocks to help the poor increase their income and thereby reduce vulnerability. Capacity in terms of education, skills, health, etc., are integral aspects of human capital which strongly influence the capacity of individuals to earn an income. Therefore, human development coupled with economic development can also assist in enhancing adaptation to vulnerability and uncertainty.

Within a population the number of economically active members of a household defines the human capital base. Labour is a critical factor of production and most rural households depend on family labour. Their major goals are related to risk aversion, as they strive to meet their consumption needs, and labour and capital also influence household responses to stresses (Mortimore & Adams, 2001). Hence, the distribution of labour use aims at diversifying activities in which individual members of a household can be

involved in order to pool benefits to the household. Apart from labour quantity, the quality of labour in terms of health and energy capability is critical. Poor quality labour can have a negative impact on a household's economic activities. Therefore, in situations where diversification has been pursued by the inhabitants, often the low returns on effort maintain households at a subsistence level. Another critical concern is the variation in the quality of human resource capital with regards to the status of households and gender. Women are particularly disadvantaged because of the high demand of their labour-time input in multiple productive and reproductive activities (Jafry, 2000).

A focus on household food security

Food security is defined as access by all people at all times to enough food for an active, healthy life (World Bank, 1986). The definition consists of supply, stability and access. Understanding vulnerability in food security assessments is important in order to effectively tackle the negative coping strategies that undermine the long-term sustainability of livelihoods. A key reason why food insecurity is not being prevented is a failure to incorporate vulnerability into food security analysis; rather, assessments tend to focus solely on assessing food deficits, without considering the relationship between a shock and the severity of impact on livelihoods (ODI, 2009).

Food insecurity at household level arises from several causes, and is most damaging when more than one cause occurs. Food insecurity as a result of drought is the most common form of environmental risk in Africa, particularly in arid and semi arid areas. In recent times, much conceptual progress has been made with respect to understanding the processes that lead to food insecure situations for households (Frankenberger, 1992). In the 1970s, food security was mostly concerned with national and global food supplies. The food crisis in Africa in the early 1970s stimulated a major concern on the part of the international donor community regarding supply shortfalls that were created by production failures due to drought and desert encroachment (Davies *et al.*, 1991). Following this episode, it became clear that adequate food availability at the national level did not automatically translate into food security at the individual and household levels. Researchers and development practitioners realized that food insecurity occurred in situations where food was available but not accessible because of an erosion of people's entitlement to food (Borton and Shoham 1991) cited in (Frankenberger & Drinkwater, 1998). Vulnerability is also a relative property defining the capacity to cope with that stressor as well. Entitlements

are the actual or potential resources available to individuals based on their own production, assets and/or reciprocal arrangements. In this regard, Sen's (1981) theory on food entitlement initiated a paradigm shift in thinking towards food security; from aggregate food availability at national level to the issue of economic access because food insecurity is associated with poverty and lack of income but not with food production .

The entitlement approach links vulnerability to food insecurity; which is also explained through the entitlement theory as a set of linked economic and institutional factors (Sen, 1981). Food insecurity is therefore a consequence of human activity, which can be prevented by modified behavior and by political interventions. In this regard, vulnerability is the result of processes in which humans actively engage and which they can almost always prevent. Sen's entitlement approach (Sen, 1981) provides an understanding of how people respond during times of shortfall in production. It also focuses on the effective demand for food, and the social and economic means of obtaining it.

The lack of a comprehensive analysis of food security and vulnerability leads to ineffective targeting (Løvendal *et al.*, 2004). In separating the concepts of hazards and vulnerability, (Dilley & Boudreau, 2001) state that it is not possible to prevent the hazard event (e.g. drought), but it may be possible to modify vulnerability to the event. This requires taking appropriate measures based on knowledge about why a group is particularly vulnerable to a hazard. In addition, worsening food insecurity was viewed by the authors as an evolving process where the victims were not passive to its effects. The concepts and issues related to food insecurity are no longer seen simply as a failure of agriculture to produce sufficient food at the regional and national level, but instead as a failure of local livelihoods to guarantee access to sufficient food at the household level (Devereux & Maxwell, 2001).

Food security is among the government's priority areas of interest in Ethiopia. A food security strategy was adopted in Agriculture Development Led Industrialization (ADLI) in 1996. Subsequently, its updated version was provided in the Sustainable Development and Poverty Reduction Program-SDPRP (2002/03 to 2004/05) and its successor, the Plan for Accelerated and Sustained Development to End Poverty-PASDEP, which spans the five year period of 2005/06 to 2009/10.

An improved understanding of food insecurity must therefore be based on a solid understanding of the rural context and livelihood strategies, as well as the factors that drive them. In this study the focus was on food insecurity as an outcome of environmental, social and economic changes, and these changes were viewed as the major factors responsible for a failure of food self-sufficiency.

Adaptation and coping strategies

Adaptation refers to the ability of livelihoods to respond to and recover from abrupt changes and stresses. Adaptive management is an approach to coping with the complexities of resource management, and is based on established indicators, testing interventions, monitoring their effects and learning from feedback (Berkes & Folke, 1998). In a rural household context, people may construct different forms of livelihood strategies such as intensification, extensification, diversification, and/or migration (Scoones, 1998). Households pursue a combination of strategies together (or sequentially). The strategies are accessible in different ways for different groups of households through the multiplicity of institutions which shape individuals' and households' behavior (Ellis, 2000). Much of the income diversification literature regards household adaptive and coping strategies as a response in which household members engage in complimentary forms of income generation in order to sustain their livelihoods in the face of adverse circumstances. From the point of view of food security, livelihood diversification may be an indication of increased vulnerability-where it is a response to failure of the previous livelihoods strategies-or it may be the path to accumulation and investment in the future also stimulus for agricultural investment (Devereux & Maxwell, 2001; Delgado *et al.*, 1994). However, it is not only in the event of a crisis that the people in the study area implement a range of adjustments and coping strategies. Rather, it exists at all times. Households in the study area have been responding to droughts and vulnerability by employing various indigenous techniques, including (but not limited to) soil and water conservation, and the combination and diversification of annual and perennial crops production activities. In addition, in order to cope with the environmental uncertainties that threaten their livelihoods, individuals in the study area are also engaged in wage labour and small business enterprises, and frequently migrate on a temporary basis to locations which have favorable farming conditions or better access to labor markets.

Given the inability of most Ethiopian smallholders to make a decent living from agriculture, due to resource constraints and recurrent shocks, policy makers have increasingly turned to supporting alternative livelihood activities. The food security strategy in drought-prone regions in Ethiopia is a reduction of production volatility, diversification away from a reliance on food crop production, an increase off-farm income opportunities, and, where appropriate, voluntary resettlement to more productive areas (Teshome, 2006). In this respect, people in Konso diversify between farming and off-farm activities. The income diversification by the local people of the study area is considered as a response to declining income from crop farming and rising food insecurity.

The approach to livelihoods depends partly on the geographical and agro-ecological situation centered on the links between the livelihood and natural resource base (Whitehead, 2002). In areas with environmental stress, the discussion is dominated by discourse pertaining to uncertainty and risk related to natural resources. In other circumstances people's livelihoods shift from being directly based on natural resources to livelihoods which are based on a range of assets, income sources and product and labour markets (Bebbington, 1999). As such, this study examines the dimensions of livelihood diversifications among households in the study area in light of existing policies and institutions. Also the major institutional and policy reform challenge to be addressed in the study area is to ensure that vulnerability to drought, as well as uncertainty and adaptive capacity, are considered by all institutions as a cross-cutting issue in their planning activities.

Farm tree resources and tree growing

The promotion of tree growing on farms can be achieved by redefining livelihood resources and needs as the broad underlying requirements, motivations and aspirations that govern the livelihood strategy choices of individuals, households and groups (Warner *et al.*, 1999). Such factors include an understanding of availability, and the access and allocation of resources in order to achieve household needs for food, livestock, tree production and other basic needs including enabling policies. This is directly linked to the assessment of households' land, land resource use patterns, existing tree/forest resources, financial capital, labour sources, markets etc., which are determined by farmers' overall livelihood strategies and linkages in the resources base as portrayed in the livelihood framework.

Growing of trees in Konso could be categorized as one of the intensification strategies adopted by the farmers. Accordingly, one of the focus objectives of the study was to examine the potential role of tree growing by households in Konso's farming system as an alternative means to enhance livelihoods (i.e. in the context of farm household needs and livelihoods strategies). Trees help in meeting household subsistence needs and in generating income. Trees in the study area are predominantly used for household consumption in the form of construction wood, fodder for livestock, human food, fuelwood and environmental benefits. Arnold (1998), summarizes the contribution of forest/trees to rural livelihoods as subsistence goods (fuelwood, fodder, construction material); farm inputs/ services (shade, soil nutrient cycling, soil conservation); income (to fill income gap and special needs); and as a means to reduce vulnerability (subsistence and income generation in times of hardship).

Assessing the current use of trees, and examining the links between tree growing needs, assets and allocation of resources are critical considerations in determining the extent to which the contributions of farm trees to rural households are viable and attractive.

In addition to the resources needed, the policy and institutional links of the SLF have been used to analyze the conditions under which farm tree growing is likely to be a viable option. This includes exploring key supportive policies, programs, and infrastructures which are essential conditions to not only secure self sufficiency, but also to enhance income earning possibilities from farm trees. This has also involved examining alternative ways of extending areas of livelihood support to the community in order to promote tree growing.

Power relations, policy and institutional environment

A whole range of polices impinge upon natural resources management: agricultural services, environmental protection, land tenure, credit, input supply and so on (Keeley & Scoones, 2003). This brings a range of different actors from both within and outside the local and national and even from global levels. Therefore, it is important to identify who is included and excluded in the policy formulation process, and that space is created in which the rural poor have an opportunity to influence the policy process. As such, the strength and weakness of policies and institutions can positively or negatively affect choice of livelihood strategies.

Institutions affect the vulnerability and adaptation capacity of people. In particular, power relations influence people's access to resources. This is better understood through the agency and structure. These structural forms subsequently shape people's action; not by strict determination, but rather by providing flexible orientation points which may either constrain or enable what actions are possible (Leach, 1999). Therefore, linking agency and structure concept provides lesson that can be applied to livelihoods approach.

The policy priorities of poor people will be realized more effectively if they have the capacity to articulate their demands and influence the policy process. Many policies have an impact on livelihood assets and options due to governing access to assets, regarding provision of services, or managing response to shocks such as drought (Pasteur, 2001). Understanding the context and assets available to poor people will help to locate priority policies and policy sectors. Empowerment is a group's or individual's capacity to make effective choices and to transform those choices into desired actions and outcomes (Alsop *et al*., 2005). This capacity, however, is influenced by interrelated factors of agency and structure. The agency structure concept advocates that the right to participate is the right to claim and promote democracy and better governance as well as the individual's ability to exert pressure for changes that affect their livelihood. The concept of participation and empowerment in a development intervention are very closely linked. Therefore, polices should create provisions for enabling participatory mechanisms, and develop institutional arrangements as a means for achieving the goal of empowering people-especially with regards to the poor and marginalized. Policies that have an impact upon livelihoods may come from different levels - be it on the local, regional, and/or national scale-but, if participation means empowerment of the poor, it must be understood in the context of the existing socio-political power structure of the particular area in question. Getting the right polices and (subsequently) the right action in terms of policy framework is central to development efforts.

Conceptual framework of vulnerability and capacity to adapt

The study adopted a conceptual framework where the SLA was complemented with the agency and structure concept in order to better understand livelihood systems; with the vulnerability of households being at the center the approach (Figure 2). The conceptual framework depicts vulnerability as a function of environmental and economic constituents which are mediated by social factors. As such, it is essential to get to know

the context-specific environmental, economic, political, social and historical aspects of the situation, as this influence the dynamics of livelihood and the extent of vulnerability.

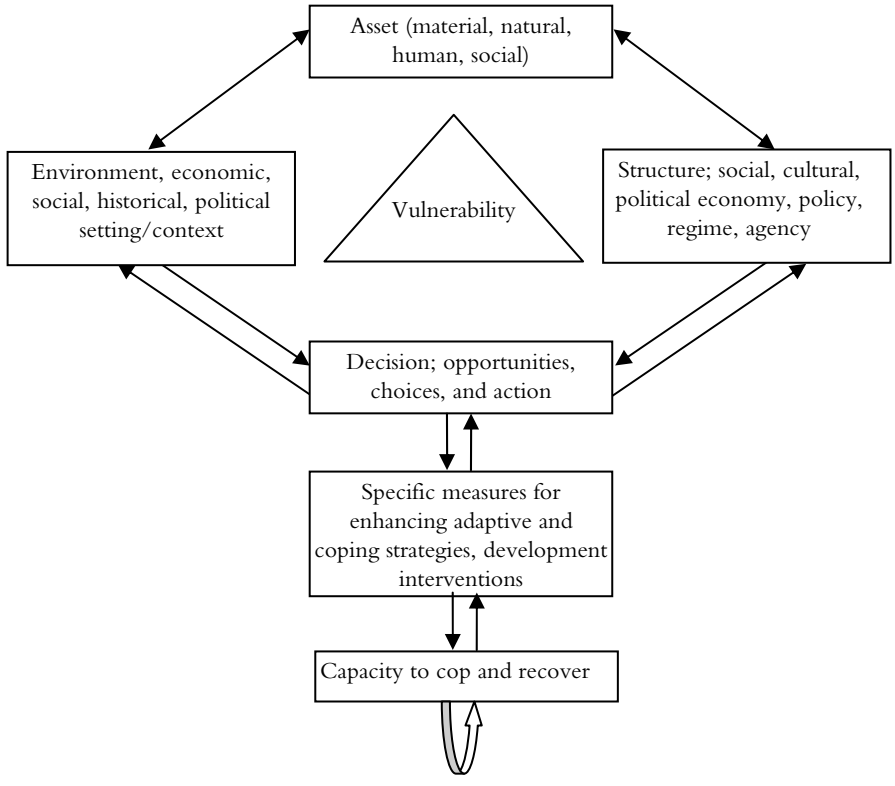


Figure 2. Conceptual framework of vulnerability and capacity to adapt

Assessments of basic assets and opportunities are essential as they determine the capacity of a household or community to cope with risks and shocks. The goals of households living in dryland areas normally involve managing and maximizing diversity and adaptability in their livelihoods systems. Diversity in resources and in options available to households define the scope of the response that can be made. However, barriers posed by socio-economic, the political structural environment, and socio-cultural conditions may limit opportunities, choices and actions. In this regard, the analysis should move beyond the conventional concern that employs a household asset and coping strategy focus; rather, it should also incorporate insight into

the institutional, economical, political and cultural aspects, in an effort to increase opportunities for the poor and improve their livelihoods.

The concept of "structure" refers to the institutions, traditions, norms, values and ethos of a community(Ritzer, 1996). It also refers to large-scale social structures. However, it can also refer to micro-level structures, such as those involved in human interactions (Ritzer, 1996). Concepts of agency and structure are not mutually exclusive and are inextricably linked (Giddens, 1984). Human agents are individuals as well as organized groups. Social classes, such as caste or ethnic groups, are also considered to be actors. Agency refers to these kinds of conscious and creative actors (Ritzer, 1996). This helps us to better understand the power dynamics. In a society, power takes the form of ownership of resources and defines agendas. Individual action or agency-in particular, individual hazard perception and choice of behavior in the face of hazards-is constrained not just by imperfect information but by the relationship between agency and structure including power, marginalization, political economy, entitlement and other infrastructural provisions (Wisner & Luce, 1993). In order to identify the causal power structure, the conceptualization of an agency and structure relation offers a promising ground in which to understand how the power structure influences an agent's behavior. The relation between structure and agency has a lot to offer when we are to understand who has access (or the ability to benefit from) a resource (Weigelt, 2008). From the perspective of the SLA, productivity of assets can be increased by investing in measures that help to raise agency capacity. This focus enables vulnerable groups to be engaged in more adaptive strategies than coping strategy choices. In this regard, Carney (2003) suggests that the sustainable approach should integrate individual agency into livelihoods analysis such as households issues of accessible justice, political voice and human rights in order to address dimensions of freedom and opportunities which are available to people to make use of their assets.

Without addressing the issues of agency and structure, one cannot sufficiently facilitate the process of social transformation. The interplay of agency and structure makes social change and transformation possible. We see challenges in both the agency and structure. For this reason, the analysis of the findings in this study includes both an agent and structure-oriented approach as well as consideration of the livelihood framework as it applies to vulnerability and livelihoods.

3 Methods

3.1 Description of the study area

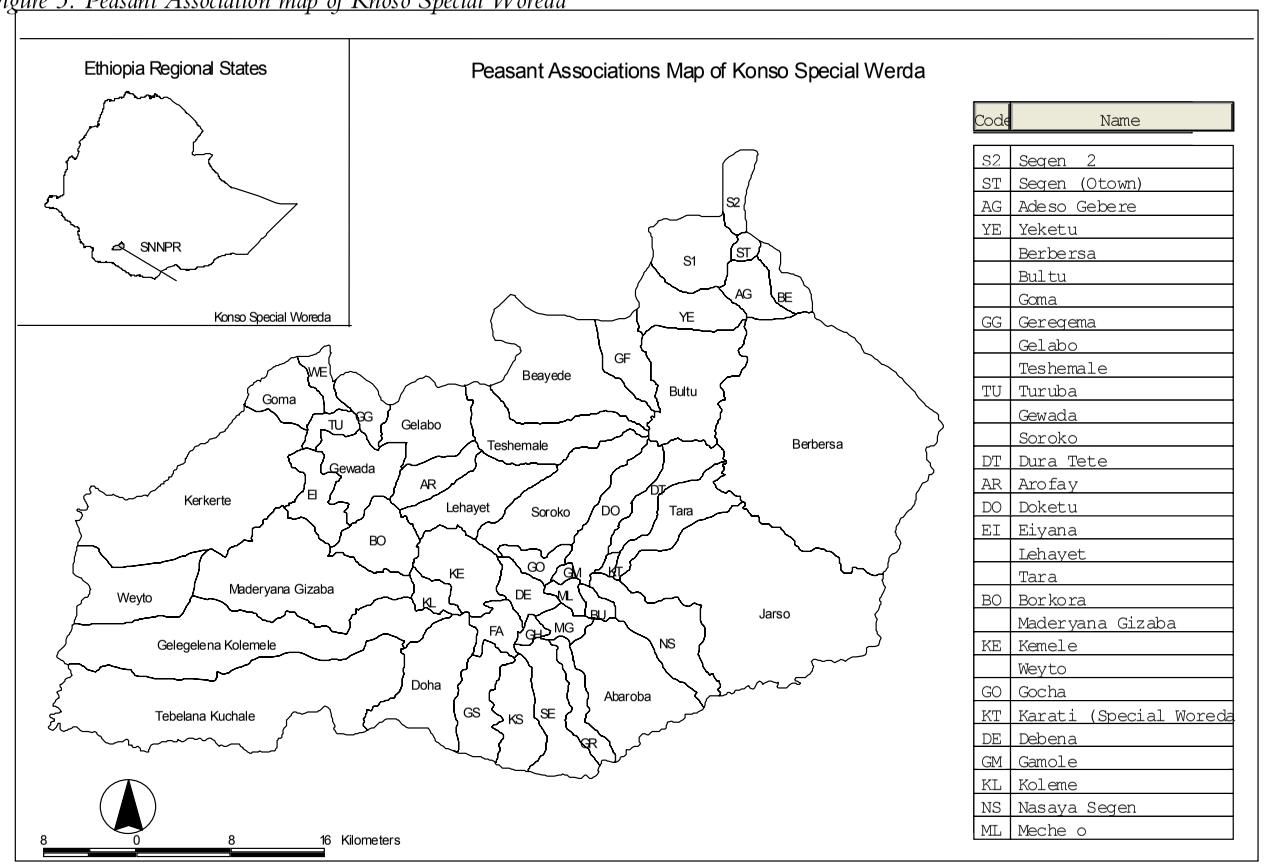
3.1.1 Location

Konso is located in the Southern Nations, Nationalities and Peoples Region (SNNPR), in south-western Ethiopia, and is situated about 600km south of the capital Addis Abeba, and 90 km south of Arbaminch, the capital of North Omo Zone (Figure 3). The SNNPR has an area of 112,313 sq. km., which comprises 10% of the national area (CSA, 2007). The population is13,500,000; which is about 18 % of the country's population (CSA, 2007). The region is divided into 13 zones having 145 *Woreda*s, of which seven of them have a status of special *Woreda*s (CSA, 2007). The region is composed of more than 45 indigenous ethnic groups with distinct languages and cultures. The SNNPR is a region of immense ecological and cultural diversity; ranging from arid and semi-arid climatic conditions to cool temperate areas. The diverse climate and topography of the SNNPR provides range of natural environment which supports/sustains a wide variety of fauna and flora. Compared to other regions in Ethiopia, the SNNPR has a relatively wide area of forest cover; within which there are several registered and protected forest areas. In general, shrubs, bushes and dense forests cover about 18% of the total area of the region.

Konso, one of the *Woreda*s in the SNNPR, was accorded a special status because of the unique ethnic and cultural identity within the region. The Konso highlands run across the Rift Valley in an east-west direction, and are situated in the lower side of the highlands' low-potential areas which are characterized by dry climate. Topographically, the Konso region is

comprised of a rugged landscape which is predominantly composed of many hills. The Konso *Woreda* is part of the volcanic-sedimentary region is characterized by a relief of medium mountains, between 1400-2000 masl (Elise, 2002).

Figure 3. Peasant Association map of Knoso Special Woreda



Code	Name
S2	Segen 2
ST	Segen (Otown)
AG	Adeso Gebere
YE	Yeketu
	Berbersa
	Bultu
	Goma
GG	Geregema
	Gelabo
	Teshemale
TU	Turuba
	Gewada
	Soroko
DT	Dura Tete
AR	Arofay
DO	Doketu
EI	Eiyana
	Lehayet
	Tara
BO	Borkora
	Maderyana Gizaba
KE	Kemele
	Weyto
GO	Gocha
KT	Karati (Special Woreda
DE	Debena
GM	Gamole
KL	Koleme
NS	Nasaya Segen
ML	Meche o

The climate combines the characteristics of a semi arid climate; irregular and little abundant rains with inter-annual variability. The mean annual rainfall in Konso is 550 mm, or, with significant variability, 280-880 mm. Based on the traditional agro-climatic classification, 70% of the land is in the Kola agro-climatic zone (warm semi dry with an altitudinal range between 500-1500 masl) while 30% is in the Woina Dega Zone (cool sub humid on the mid altitudes of 1500-2300 masl). 60% of the population live in the Woina Dega Zone.

According to CSA (2007), and the National Population and Housing Censes of Ethiopia, the Konso population is currently 230,500 within the total area of 2300 sq. km.

3.1.2 Settlement history

The name Konso came from the word *Konsita*; literary meaning hill farming living in fortified villages surrounded by their farms. The first settlers of Konso are believed to come from three directions. Those who came from the east, crossing the Segen River, are believed to be from Borena and Yavelo and have settled at the present areas of Dukato, Naleya Segen, Jarso, Durayte and Dera. The second settlers who came from the west (i.e. from Jima and Ilu Ababora through South Omo) have now settled in the places of Gobeze, Gurguma and Wolango. The third settlers, who came from an east-west direction (i.e. from Gedeo through Aylota), have settled in the area now known as Dukato, Sorobo, Durayte and Dera. There are also other oral histories that tell us there was a tribe called Koyra who lived in Konso before those settlers. The Konso people are composed of nine clans; Tokmaleta, Elayta, Tikesayata, Ishalayta, Kertita, Pasanta, Arkamayta, Sawdeta and Mahaleta. According to the key informants, settlement and ownership of land was initially established by the first settlers by igniting fire on the forest land. The place where the fire stopped was claimed as the boundary of their own land by that particular group of settlers, and in some cases they put marks on the trees for claiming it.

3.1.3 Land of intensive agriculture and terracing

Konso farmers living in the Woina Dega (middle altitude) area are intensive agriculturists who subsist primarily on sorghum and maize intercropped with other many crops. A remarkable feature of the Konso farming system is that trees play a central role in the complex mixed farming practices. One of the peculiar features of the Konso farming system is the diversity of food crops

and trees intercropped and integrated with varied management practices. They grow sorghum, maize, peas, haricot beans, millet, wheat, barley, coffee and root crops in a mixed manner in the fields, while also combining these crops with trees and shrubs (i.e. as in a traditional agroforestry system). The livestock are kept in houses with stall feeding which permits manuring of farmlands that are close to the villages. Watson (2004) observed that the resulting landscape is impressive-especially in contrast to the surrounding dry lowland areas-and that Konso appears like an island of intensive agriculture. The traditional cultivation of the "cabbage tree" *Moringa stenopetala* (*shelqata* in Konso*, shiferaw* in Amahric language) in Southern Omo, and particularly in Konso, has a special significance where the fresh leaves serve as a vegetable cooked and eaten as a staple food in individuals' regular meals. The tree is abundant and densely gown in the villages for easy access, while also being scattered on farmlands.

The Konso people of Southern Ethiopia have been known for their conservation practices. Through time the people have developed their own mechanism of retaining their soil by developing a complex, and yet entirely their own, terracing system. The terraces are one of the most immediate and striking features which have almost covered the whole middle altitude areas of Konso. There is no evidence explaining the specific development of terraces, however, they are said to be well over 400 years old. The hill tops dominated by villages, the diverse components and combination of crops, as well as the trees and terraces on lower cultivated land that have been formed through several years of interaction between the people and their environment, illustrate the continual and consistent efforts of the people in combating the vagaries of nature. These phenomena also reflect how the value and age old norms of the Konso society's recognition of nature and sustainable utilization have been strongly institutionalized.

In order to ensure their value, effectiveness and sustainable use, the several hundred year old terraces have been retained and continuously maintained as the result of knowledge passed down from one generation to the next. In this regard Beyene (1999) states that the peculiar features in Konso represent a record of a living cultural landscape; comprising an original technology of agricultural, terraces and fortified stone towns. The Konso site has been on the tentative list of United Nations Educational, Scientific and Cultural Organization UNESCO as a World Heritage site. Some studies suggest that the terraces were constructed in response to the less fertile soils and

hilly/mountainous nature of the area, and that the people have developed different land management practices as a result of the surrounding environment. In this study, interviews with older people of the community explained that historically their ancestors were living on much of the hilly bottoms, but as a result of over-flooding and malaria the people slowly started settling on the steep slopes while retaining the crop fields on the bottom hills. The expansion of villages and agriculture on the steep hills increased runoff from the hills, thereby causing damage to both the lower and the upper crops and progressively expanding in the upslope direction. Therefore, in an effort to protect these farm lands, people started building terraces. The primary objective of the terraces was to reduce runoff and soil erosion from up-hill and to divert it to a safe outlet.

The other remarkable feature/scene of Konso is the villages located on the top of hilly and mountains landscape known as *Kanta* that are fenced with high wall of stones with Euphorbia species as a fire break and dense stands of *Moringa stenopetala*. Individual compounds within the village are well fenced by stones and wood. Each *Kanta* has its own *Kanta* leaders or representative, and consist of large, open public place where general discussions, religious ceremonies and socialization are carried out.

3.2 Data collection

3.2.1 Integrating Qualitative and Quantitative research methods

In order to improve the internal validity of the findings, a mix of qualitative (i.e. semi-structured and/or open-ended interviews, consisting of discussion topics and a checklist) and quantitative methods (i.e. a questionnaire survey) were used in a complementary manner. This approach also helped to build a comprehensive picture of the livelihood system and the resource base in Konso. Qualitative research methods provide insight into the identification and understanding of human behavior and social phenomenon and experience. Qualitative research usually emphasizes words rather than quantification in terms of numbers (Bryman, 2004). Through a qualitative inquiry, the inquirer can make knowledge claims based primarily on a constructivist perspective (i.e., the multiple meaning of individual experiences, socially and historically constructed meanings, and/or with an intent of developing a theory or pattern), or through an advocacy/participatory perspective (i.e., political, issues–oriented,

collaborative, or change or both) (Creswell, 2003). Thus, qualitative research methods help researchers understand the processes and interactions between social, cultural, political and economic factors. Often the qualitative research methodology leads to unforeseen areas of discovery within the lives of the people (Holliday, 2002). Qualitative methods reveal the 'how' and 'why', and highlight differences and variety within the range of human experiences that could help to explain, problematize, and contextualize differences and changes in the average values of variables derived from quantitative surveys (Bagchi *et al*., 1998).

Quantitative research methods, on the other hand, emphasize the quantification of variables of interest, and the study of relationships between these variables through statistical analysis of data. The data that is obtained through the inquiry provide a basis for showing the variables in a quantitative manner, and their magnitude and representativeness within the study-population. The investigator primarily uses positivist claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypothesis, use of measurement and observation and the testing of theories), employs strategies of inquiry such as experiments and surveys, and collects data using predetermined instruments that yield statistical data (Creswell, 2003).

Essentially, the qualitative research method is different from quantitative research in terms of philosophical, epistemological, or methodological perspectives. Holliday (2002) pointed out that quantitative and qualitative research do represent very different ways of thinking about the world. The debate continues with regards to the strengths and the weaknesses of each research methods, while also including arguments against integrating the quantitative and qualitative research methodologies. From the perspective of this study, however, neither qualitative nor quantitative methods alone would be able to capture the complex and multi-dimensional nature of livelihoods. One way to meet the requirements required in capturing the essence of livelihoods, is to combine the quantitative and qualitative approach. Such a strategy would seem to allow the various strengths to be capitalized and the weaknesses offset somehow (Bryman, 2004). A review of World Bank Poverty Assessments by Carvalho & White (1997), states that integrating qualitative and quantitative research is a broader issue and identifies three major ways of combining the approaches in practice: (i) integrating the quantitative and qualitative methodologies; (ii) examining,

explaining, confirming, refuting and/or enriching information from one approach with that from the other; and/or (iii) merging the findings from the two approaches into one set of policy recommendations that can lead to better action. Carvalho & White (1997), also suggest that the "the key is to tap the breadth of the quantitative approach and the depth of the qualitative approach". However, based on interviews conducted with U.K. social researchers, Bryman (2007) found out those practitioners of mixed methods research faced significant difficulties in merging analyses of quantitative and qualitative data when attempting to provide an integrated analysis.

Nevertheless, marrying both qualitative and quantitative methods has become increasingly common in the study of systems involving humans. As Creswell (2003) remarked, this approach enables the researcher to base knowledge claims on pragmatic grounds (e.g. consequence-oriented problem- centered and pluralistic). It employs a method of inquiry that involves collecting data in a simultaneous or sequential manner, as well as the gathering of numeric information and interviews/text data, so that the final data set represents both quantitative and qualitative information.

As such, the data collection methods applied in this study combined both quantitative (e.g. a household survey) and predominantly qualitative methods (e.g. PRA tools) in order to get an overview of the livelihood system in the area and to better understand the views and opinions of people with regards to the process behind the observed results. This methodology helped to explore the perceptions of people regarding their situations, and to clarify patterns from the quantitative survey findings. The PRA tools were instrumental in getting an overview of the livelihood system, and in the collection qualitative information regarding trends, views, opinions, etc., as well as to identify key quantitative variables requiring further exploration by means of a formal survey. The application of such tools ensure that farmers play a leading role in problem diagnosis, implementation, testing and evaluation of new practices (Okali *et al.*, 1994; Chambers & Sussex, 1987). One of the main advantages of PRA methods is that they help to provide a more holistic vision from the perspective of the end-user; making use of their experience, and facilitating the integration of this experience with that of the researchers in order to broaden the common knowledge-base (Chambers, 1994).

3.3 Methods of data collection

The study employed both informal survey (mainly using PRA tools) and a formal survey.

3.3.1 Informal methods

Prior to the main field work, a visit was made at the regional administration level to establish formal contact, explain the objectives of the study, and to get permission to carry out the research. After securing permission, the first visit to Konso *Woreda* was made to introduce the researcher and the purpose of the study to local government officials and to the NGOs operating in the area. Informal discussions were held to help establish collaboration and to present the objectives of the study. In the meantime, an attempt was made to get an overview of the study area and its inhabitants in terms of social, economic and environmental aspects. These discussions made it possible to select about ten out of fifty *Kebeles* (the lowest administrative unit) for the research. After having selected the *Kebeles*, discussions with knowledgeable people in the ten *Kebeles* were conducted. These discussions not only helped get an overview of the livelihoods in Konso, but also provided an opportunity to introduce the researcher and the objectives of the research. The discussion was focused on: historical background, changes that occurred over time, major farming activities and productivity levels, diversity of economic activities, status of the natural resources and their use, variations between *Kebeles*, etc. These discussions took place in culturally designated areas but were also complemented by extensive visits on sites of farming and other activities. The researcher used an interpreter and an assistant native to the area with considerable knowledge about the people and the area.

In order to collect data on people's perceptions of their livelihoods and situations, various participatory approaches can be used. The main PRA tools that were used included: focus group discussions and semi-structured interviews with key informants. The time line, matrix scoring and preference ranking exercises, as well as Venn diagrams were also employed. The discussion topics and issues to be covered were specified in advance (i.e. in an 'outline' format), with proper sequencing and careful wording, in order to give more freedom to respondents to express their views, as well as to increase the comprehensiveness of the collected information. In addition, different age groups, gender, and mix of wealth groups, as well as beneficiaries (and non- beneficiaries) of PSNP and other income generation,

were also interviewed through a series of focus group discussions. The qualitative information explored in detail the farmers' livelihood conditions, including; settlement history, migration history and pattern of mobility, population, oral history towards vulnerability to drought, agricultural production and land resource management, issues on causes of food insecurity and responses by local and external means, assets and changes over time and farmers' perspectives of their context and constraints and potentials and role of local institutions.

Based on field visits of the 10 K*ebeles* and the discussions with key informants, and with the help of aerial photographs and a reconnaissance survey in the area, five *Kebeles* were selected for detailed research based on the extent of tree cover on the cropland (high, medium, low and very low). In addition, variation in the type of crops grown, participation in PSNP and income generation programs, as well as proximity to the district town and the main road were considered in the selection of sample *Kebeles*. The first round of data collection was conducted in 2006 and 2007 (annex 1).

About 36 hours of audio-recorded discussion, 3 hours of video tape, and several pages of field notes were taken during the focus group and key informant discussion sessions and other interviews. Each of the sessions took between 2 and 3 hours. As the discussion was conducted in the local language, two translators were hired to assist the researcher both with regards to the discussion itself as well as with respect to taking notes and providing translations. At the end of each meeting, notes were exchanged and the recordings listened to in order to identify missing links and build patterns of opinions of respondents which occurred during the discussion. This helped the researcher in redefining discussion topics for subsequent discussion sessions, and to better articulate the questions to be presented.

For the analysis of the qualitative data, the contents of all audio records were transcribed (nearly word-for-word) and analyzed while using the session-notes as a supplement. As a preliminary step (when analyzing the data), sub-themes were identified by listing patterns of information and by subsequently combining related patterns which exhibited common ideas according to the research question. This was the most fundamental task in analysis of the qualitative data. The major theme was then identified from related patterns in the sub-themes. The sub-themes were analyzed in greater depth in order to identify and explain important keywords, relationships

between sub-themes, differences and similarities (found in the same or different accounts), converging and diverging opinions, and contradicting responses regarding the themes from the different members of the community involved in the discussion for all sample *Kebeles*. During the analysis, each sub-theme was explored with respect to the research question; reflecting key words in context, verifying and giving tentative explanation with due recognition of the perspectives of the participants, and eventually an overall interpretation was made and the full report was developed chapter-by-chapter.

3.3.2 Formal survey

The survey was conducted with the purpose of gathering quantitative information on a wide range of socio-economic variables. A questionnaire-based formal survey was administered to 156 randomly selected households from the five *Kebeles*. The questionnaire was pre-tested before administration. Five enumerators (2 at a BSc level and 3 at diploma education level) were hired and trained to administer the questionnaire. At the end of each day of data collection, the researcher randomly examined and checked the completed questionnaires and reported back the next morning to enumerators if there was something wrongly filled-out or not clear enough.

Out of the 156 completed questionnaires, 153 were successfully completed. During the survey, women and any mature member of the household were encouraged to take part. The reason for this approach was that only involving household heads may overlook certain aspects that the other household member(s) may want to emphasize. This allowed a more comprehensive and inclusive response. The survey elicited information on household characteristics such as: demographic characteristics, education, inventory and acquisition of assets (land, trees and livestock), past and current production levels, and relative contribution of farm and non-farm activities, etc. The data were coded and entered into Microsoft Excel software and SPSS to produce descriptive and analytical results.

3.3.3 The workshop

A two-day workshop was organized in an effort to present key findings of the study to the community, to get feedback, to identify emerging issues that require the attention of key stakeholders and to deliberate the implication of these findings within and beyond the district. 36 farmers from all sample

sites and 32 experts representing various ministries and NGOs in the *Woreda* participated in the two different workshop. To facilitate the discussion, main questions were developed for the workshop based on the preliminary findings. Participants discussed in small groups and presented their group work at plenary session. The informal institutions and PSNP (Productive safety-Net Program) that emerged from the discussions in the workshop were later included in the study. The comments and recommendations from the workshop were used in interpreting the findings of the study.

4 Socio-economic profile of the community and vulnerability to drought

4.1 Age structure and sex composition

Age structure and sex composition of a society are fundamental demographic data when examining population characteristics. The age composition largely influences the social and economic bases of a household. At a household level, the sex composition and age structure have an impact on the availability of labour in allocation for different tasks.

The number of family members (per household) in the covered *Kebeles* ranged between two and sixteen, but most households, or about 74%, are composed of between four and eight persons. Accordingly, the average family size in the study site is found to be 6.6 persons per household (see annex 3). This figure is higher than both the national and regional figures for average family size, which are 4.8 and 4.7 persons per household respectively. The population distribution of the study area has reflected a young population pattern, i.e. that the proportion of the people in younger age groups are much higher than the proportion of the people in older age groups. The age structure of the population shows that children under 10 years of age accounted for 35% of the total population, and, if the next age group of 10-14 years is included, then these age groups represent as high as 50% of the total population. At the opposite end of the age spectrum, the population age group of >65 years old accounted for only 2.4% of the total population. With a mean age of 19 years, this shows the fact that the population of the study site is young and reflects the young age structure of the Ethiopian population (See annex 4).

An analysis of the age structure has shown that it is progressive in nature (i.e. a high proportion of children, thereby reflecting a high potential for fast population growth). In demographic studies, it is customary to categorize the population into three structures, based on age. These are the working population (i.e. individuals between 15 and 64 years of age), children below working age (i.e. under 15 years of age) and people who are supposed to be not working due to old age (i.e. above 65 years of age).

In our case, according to the results of the survey, 51% of the population is under the age of 15 years, while only 1.6 % are over the age of 65. This suggests that the dependent age group of population (i.e. those below working age) accounted for 52.6 % of the total. These results imply that the working population is 47.4% of the total. This ratio is higher than the national level, and indicates that there are more than one dependent for every working individual. This imposes greater economic disadvantages at both the household and *Woreda* level due to, for example, smaller per capita outputs, lower financial savings, and a decrease in investments available for social and economic development.

The sample population for the formal survey was households in five selected *Kebeles*, namely; Arfayde, Dera, Debena, Buso and Mecheke. The majority of the respondents belonged to the age group of 16-45 years, followed by the 46-60 year age group. Female headed household respondent accounted for about 22% of the total sample (Table 1). Regarding the literacy level of the respondents, it was found that 76% could not read or write (see Annex 5).

Table 1. *Age and sex composition of respondents by age category*

			HH age group			Total
			16-45	46-60	>60	
Respondents	Male HH	Number	90	24	6	120
		% within Respondents	75.0	20.0	5.0	100.0
	Female HH	Number	31	2	0.00	33
		% within Respondents	93.9	6.1	0.0	100.0
Total		Number	121	26	6	153
		% of Total	79.1	17.0	3.9	100.0

The study site is also one of the poorest in terms of the development of rural infrastructure until recently. The farmers have recognized this aspect, and are facing the direct and indirect effects of increased demographic pressure on their environment, as well as the difficult socio-economic situation that is threatening their livelihoods. Land productivity is already low, and to have a high proportion of children in the population indicates the inevitability of land fragmentation and additional pressure on the natural resource base and ecological systems. These factors ultimately result in a compounded risk towards the deterioration of land productivity in the area.

4.2 Education level

Based on the results of the study, the total literacy rate was 36% (46% for males and 25% for females). The findings from the study site also showed that, out of 166 boys of school age (i.e. 7-14 years old), 36% attended schools. The female attendance in primary schools (within the same age category) was only 16%. Late starters, aged 15-20 years old, in school enrolment accounted for 26%. The proportion of secondary education attendance within the 15-19 year age group was about 6%, and, if the next age category, 20-24 is included, the attendance value was perhaps as high as 9% for boys and less than 1% for girls. In general, the results suggest that primary education attainment in Konso is much lower than the national average and that females are particularly disadvantaged in terms of the acquisition of education. Prolonged drought and dependency put limitation upon the households' ability towards self sufficiency which also prevent households from sending children to school (see Annex 5).

Studies show that non-farm employment and income are significant in rural areas. There is a link between education development and livelihoods. Educated people are more open to changes, with respect to, for example, methods of production, health practices, creating and/or managing a business (etc.). Often, this flexibility enables them to benefit from interventions. When considering the education level with respect to the gender of the household head, the results indicated that female-headed households were less educated (see Annex 6).

4.3 Assets

4.3.1 Land tenure and farm size

4.3.1.1 Land tenure

Land is a basic asset for food security, economic growth and poverty reduction; particularly in countries where the majority of the population depends on agriculture for their livelihoods. The land tenure system in pre-1975 Ethiopia varied from region to region due to the diverse geographical, socio-economic and cultural settings. These different land tenure arrangements, in general, can be classified into use-right tenures and private tenures (Rahmato, 1984). Under the former arrangements, the customary 'rist' system was dominant-mainly in the northern highlands where farmers could claim access to ancestral land. Such land was inheritable and tradable in the rental market, but could not be sold or mortgaged as the land did not belong to the individual. Following the conquest of the region in the late nineteenth- and early twentieth-century by land lords from central Ethiopia, landownership patterns in the southern part of the country developed as a result of land grants. Following the conquest, officials divided southern land equally among the state, the church, and the indigenous population (Donham & James, 1986). In a similar manner, those who administered the occupied regions received the state's share and redistributed part of their share to their officers, traditional leaders and the indigenous people. These tenure systems were part of a larger socio-political system in which security was highly stratified, and included considerable extraction of "surplus" from the peasant farmers (i.e. *rist* holders and tenants); either through the *gult* system, in which tribute was collected by *gult* holders (i.e. nobility, the military and clergy), or by the land owner in the form of rents (Wood, 1987). Under the private tenures, which prevailed in the south, the rights to land included transfer through sale and mortgage. The land reform of 1975 brought an end to the type of relationship that had formerly existed between tenants and landlords. Tenants became own operators with use rights, but with no rights to sell, mortgage or exchange the land. These use rights are inheritable. Subsequently, since 1988/89, a restricted and short-term leasing of land use right has been allowed. More recently, since 2003, land certification has become an option, however, registering plots and issuing certificates has not yet been implemented in the study area.

In terms of productivity and sustainability, one of the reasons why agricultural development is so unsatisfactory in Sub-Saharan Africa is that there is no investment. In some cases this is due to a lack of security of tenure which, in turn, is due to the absence of private property (Lund, 1998). Because of a high sense of tenure insecurity in Ethiopia, farmers can not employ sound land management practices and are reluctant to invest in land (Rahmato, 1991). These statements underscore the direct linkages between the land tenure system and land productivity. Here the assumption is that enhancing access to land/ security of land will ultimately improve food security and the overall welfare of the society. The logic of creating tenure security is to enable increased investment, conservation, and agricultural intensification; and these will only take place when land is privately owned. Secure rights in land and control over its produce are an important basis for motivation (DFID, 2002).

Privatization of land has been seen as an essential element to improving land and labour productivity through consolidation of land that can not be achieved with the current small and fragmented land holdings. Property right in land stimulates better access for credit, which could in turn be used for investing in land improvements such as soil conservation and/or for the purchase of inputs to improve land productivity. Land could also be used as a collateral asset in which to secure credit for other farm related or non-agricultural income activities. Alongside the production and sustainable land management advantages of secure land rights, access to credit can serve as a source of security in times of crisis (DFID, 2002).

Here it is important to note the possible negative consequences of increased landlessness in rural areas in the country unless a certain mechanism is developed related to locally based economic strategies. Such mechanisms should not include rapid industrialization to absorb those left out of agriculture; rather they must depend on the containment of economic activity within the locality if agriculture and non-farm expansion are to go hand in hand (Start & Johnson, 2004).

The Ethiopian Government's Agricultural Development Led Industrialization Strategy (ADLI) is largely based on the optimal use of both labour and land as a primary resource for economic development (FDRE, 2002). The strategy is designed to enhance the productivity of the agricultural sector by improving crop husbandry and agricultural

technologies through the development of irrigation options/methods as well as providing the necessary inputs to improve productivity. The skills, knowledge, health and physical capability of a household are crucial in this program. This requires enhancing the labour productivity through education, extension, provision of credit and health services.

The brief explanation above shows that land and natural resources are the key, and in many situations the *only*, resources in which the peasant production system primarily depends upon. Access to land is an important issue for the majority of Ethiopian people who, in one way or another, depend on agriculture. Many authors have extensively covered the subject of the land tenure system in Ethiopia, and the issue of land tenure is, and will remain, at the center of the political debate surrounding this topic.

4.3.1.2 Land holding

According to the informants, in Konso, the political, social and ritual leaders of society (known as *Paqola*) are believed to be the descendents of the first settlers, and belong to any one of the nine clans owning large tracts of land. In the earlier period of Konso's history, anyone who wished to obtain land asked the *Paqola* to whom his clan belonged, and, barring the approval of the *Paqola*, land was subsequently granted to the individual. Therefore, *Paqolas* are credited with being the first born descendants of the founders of their clan or lineage (Watson, 2004).

In addition to land granted to clan member, sometimes the *Paqolas* also gave land to individuals upon request outside his clan members. The *Paqola* seems to have the right as an individual to dispose of the land as he wishes; as if by exclusive ownership (Watson, 2004). The borrower had a use right for the land, including the use of perennial crops, and could bequeath the land to his children, but the land could not be sold or transferred in other forms. Borrowed and gifted lands were usually given by the *Paqola* to the user 'free of charge' and were usually given for a longer and indefinite time period. Any adjacent land that was not claimed by the *Paqolas,* or any other type of land which is called Komayta (i.e. common /public land), could be cultivated without any request. The Komayta areas, however, are typically located far in the lowlands - away from where people have settled - and, due to insecurity and spiritual reasons, individuals preferred to get the land from the *Paqola* of their respective clan.

Currently, the ownership of agricultural land in the previous freehold Komayta is going through a process of formalization with consultation and involvement of traditional leaders. What did the *Paqolas* get in return for their land? As mentioned above, the *Paqolas* own big tracts of land; and thereby required labour for cultivation and maintenance of their terraces. As such, those who had obtained land from the *Paqolas* contributed labour two or three times a year; mainly during the preparation of land for cultivation, weeding and harvesting time. It is also important to note here that the *Paqolas* not only give land to individuals, but they were also the primary contributors of food grain to those in need of food assistance during drought and difficult times. Prior to the 1974 Ethiopian land reform proclamation, those who obtained land from *Paqolas* were also obliged to pay land taxes to the government. The farmers collected the money and gave it to the *Paqolas* who gave them the land; thereby paying the tax by his name in order to ensure his continued rights and/or ownership of the land.

While most *Paqolas* own big land, there are also non-*Paqolas* who also have large plots. Currently, there are few cases where landless could acquire land from *Paqolas* without any payment for using the land. The difference today from the previous land grant by the *Paqolas* is that the person who borrowed the land cannot transfer the land to his children in the form of an inheritance as in the previous time. In addition, the grant undergoes a more formal and informal process. As mentioned above, during the feudal time, the land tenure system in the southern part of the country was a landlord and tenant relation system. Much of the land was occupied by the feudal government authorities and relatives. With the exception of few places in Konso, most of the land was of little interest to the landlords. The reasons mentioned by farmers was that first the farming system in Konso unlike the central and northern parts, cultivation of land has been hand hoeing with narrow terrace which does not allow ox plough for production of *teff* and cereals like wheat. As a result the landlords expected low yield of *teff* or wheat. In addition, the condition of the land, as well as the fertility of the soil was considered to be poor by their standards. These and other factors led to a lack of encouragement towards occupying much of Konso's land. In this regard, an ethnographer, Hallpike (1972), pointed out that the steep terraced slopes of Konso were not suited for the cultivation of *teff*, and ploughs could not be used there and the great land owners of the north could not expect a worthwhile yield of cash crops from small terraced fields. In addition, the

land owners opted to avoid the zone due to the hot temperatures and the presence of malaria.

What changes did the 1974 land proclamations bring to Konso farmers? As mentioned earlier, in most areas of Konso the landlord-tenant relation was not so high and, as such, the impact of the land reform proclamation was not felt as strongly by the farmers. As discussed above, farmers who borrowed or obtained land from the *Paqolas* provided labour in return. This is different from the landlord-tenant relation where one-third of the produce was given to the land owner. As such, the 1974 proclamation- which completely abolished the landlord-tenant relation-has not held as much importance in Konso as it has held elsewhere. The most important change brought by the proclamation is that farmers pay land taxes to the government by their name; thereby giving them a sense of ownership. However, due to cultural reasons and the value and respect they give to the *Paqolas*, there are farmers who, even at present, believe that the land they are cultivating belongs to the *Paqola* who gave them the land. There are even some borrowers who are willing to return the land they borrowed if the original owner (or his successors) were to re-claim their land. This shows how significantly strong customary land right has been in Konso. Another notable change was that the labour to be provided by the household who obtained land from *Paqolas* has been less compulsory and is now often conducted on a voluntary basis.

Land fragmentation is a common landscape feature of Ethiopian agriculture. In the 2006 cropping season, 82% of rural households operated less than 2 hectares; 55% cultivated farms less than one hectare; and 30% operated land sizes of 0.5 hectare or less (CSA, 2006). These small farms are fragmented, on average, into 2.3 plots. In this respect, Konso is not different but fragmentation and the number of plots owned by households is relatively high compared to other places in the country (Table 2).

Table 2. *Percentage distribution of plots by household*

Number of plots	Village Name									
	Arfayde		Dera		Debena		Buso		Mecheke	
	Number of plots		Number of plots		Number of plots		Number of plots		Number of plots	
	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%
1	1	3.3	2	6.9	4	11.1	2	6.7		
2	4	13.3	9	31.0	2	5.6	8	26.7	6	21.4
3	7	23.3	14	48.3	13	36.1	13	43.	10	35.7
4	5	16.7	4	13.8	10	27.8	6	20.0	2	7.1
5	7	23.3			1	2.8	1	3.3	3	10.7
6	4	13.3			4	11.1			3	10.7
7					2	5.6			3	10.7
8	2	6.7							1	3.6
Total	30	100.0	29	100.0	36	100.0	30	100.0	28	100.0

The field survey results showed that there was a significant variation with respect to the number of plots belonging to the studied households. The number of plots ranged between 1 and 8. The average number of plots per household was 3.48. Most farmers (74%) owned between 2 and 4 plots. This value was followed by owners of 5-7 plots, which comprised 18 % of the sample. Also, a correlation ($r= 0.34$, $P<.05$) was observed between number of plots and family size. Among the major reasons suggested by farmers for such fragmentation is the result of population growth with impact of declining average farm size due to the system of inheritance, in order to ensure that every adult male child of the family has been given access to land. Another important aspect is that the plots are located in different areas with different characteristics; resulting in each farmer owning different plots with different soil characteristics. With this aspect in mind, a comparison was made to see if there were variations in number of plots between the studied areas. Arfayed and Mechke contained a high concentration of plots and have shown differences when compared to Dera, Buso and Debena. The major reasons for a high concentration of plots in these two *Kebele*s are that Arfayde is an ox plough cultivation site and is relatively suitable for sorghum and cereal crop cultivation, while Mecheke lies within a sub-humid climate thereby allowing for the growth of a variety of crops.

Another reason associated with having several plots located at different sites is that it is a strategy to reduce risk associated with unreliable rainfall and poor soil conditions. By cultivating many different plots endowed with differing qualities the risk will be lessened. Another benefit mentioned by farmers interviewed was that the different plots enabled them to grow a wider mix of crops, more than five crops in each plot, and helped to facilitate the rotation of crops on the various plots. Application of the practice of fallowing is rare, and is employed only by a few farms. In addition to minimizing the pertinent environmental risks in Konso, such combinations maximize the use of available moisture and soil nutrients. For example, small pieces of flat stones distributed throughout the farm land serves as a soil covering mulch. This practice, which to the layman could perceived to be a useless land full of stones, is considered good with respect to protecting moisture evaporation from the soil surface and is useful for initial seed germination and growth.

Land holding size is considered a critical production factor which determines the type of crops that are grown and the size of the crop harvests. Under the

subsistence agriculture system, holding size is expected to play a significant role in influencing crop production and households' food security. In order to determine landholding size, fifteen representative plots were selected and measured. In the survey, on average, the holding size per household was found to be approximately 0.7 hectares. Table 3 presents eight categories of landholding sizes and the proportion of farmers that fall under each group. The total land occupied by each respective group is also presented. About 3% of respondents owned land holdings of 0.07 hectare or less. The majority of the respondents (34%) own landholdings less than 0.5 hectare, whereas 33% own between 0.5-1 hectares. Thus, 6.5 % of the farms in the survey consisted of a landholding size of greater than 3 but less than 7 hectares and most of these are found in Arfayde.

Table 3. *Land holding size distribution by size category*

Area Ha	Kebeles										Group total	
	Arfayde		Dera		Debena		Buso		Mecheke			
	Freqn	%	Freqn	%	Freqn	%	Freqn	%	Freqn	%	Number	%
<0.07	0	0	0	0	4	11.1	0	0	1	3.6	5	3.3
0.071-0.5	2	6.7	13	44.8	4	11.1	21	70	12	42.9	52	34
0.51-1.0	9	30.9	14	48.3	16	44.6	7	23.3	4	14.3	50	32.7
1.1-1.5	6	20	2	6.9	7	19.4	0	0	5	17.9	20	13.1
1.51-2.0	5	16.7	0	0	2	5.6	0	0	4	14.3	11	7.2
2.1-2.5	2	6.7	0	0	2	5.6	0	0	0	0	4	2.6
2.51-3.0	0	0	0	0	0	0	1	3.3	0	0	1	1.07
>3.0	6	20	0	0	1	2.8	1	3.3	2	7.1	10	6.5
Total	30	100	29	100	36	100	30	100	28	100	153	100

The variation in landholding was significant among the study *Kebele*s, with a range between 0.07 hectares in Debena to 6 hectares in Arfayde. Based on these results, in terms of the size of their holdings, the farmers in Arfayde are faring much better than in neighboring *Kebele*s. In this *Kebele* close to half (43%) of the sample farmers cultivate more than one and half hectare. The corresponding proportions for Dera, Debena, Buso and Mecheke are 0%, 14%, 7% and 7% respectively.

It should be noted, however, that the farmers stated that having a large farm land area does not necessarily translate to a capacity to produce more food; rather, often the reverse is true if the production per unit area is taken into consideration.

4.3.2 Livestock ownership

As is the case elsewhere in the country, livestock in Konso are considered as a means of accumulation of asset. All respondents indicated that the primary benefit to livestock is that it serves as a store of wealth that can be sold when there is great need for money. The respondents indicated that the second most important reason was for household consumption such as milk and butter (which are also scarce in Konso). If they do not have their own livestock, households engage in a shared rearing arrangement in order to get milk and butter. This arrangement also benefits households with a large livestock size but are unable to feed the animals. Based on the study, the third factor that motivates farmers to keep livestock is to attain manure in which to replenish the fertility of their soil. Manure is collected from the livestock pens in the homesteads and taken to be spread on the fields; especially those located close to the villages which are rarely fallow. Those with a large number of livestock often live outside the village (called *fora*), mostly in the lower lands where grazing for large livestock is available. It should also be noted that animal traction was indicated as an additional motivating factor for having livestock. This was noted by farmers at the one study site where ox ploughing has been historically practised. In addition, farmers enter sharing arrangement in order to effectively utilize the crop residues and fodder from their farmland.

According to the information collected during the survey, the mean number of oxen and cows reported per household was less than one (0.68 and 0.71), respectively. About 60% and 54% of the sample households did not own ox(en) or cow(s), respectively. 1-2 oxen and cows are owned by 34% and

39% of the sample households respectively (Table 4). The maximum number of owned oxen and cow reported during the study was 5 and 7, respectively. An analysis was also made to understand if differences exist in terms cattle ownership. The findings showed that two *Kebeles*, Arfayde and Dera, exhibited significant differences from the other *Kebele*s.

Table 4. *Livestock ownership for selected livestock (%)*

Quantity	Livestock type		Quantity	Livestock type	
	Ox	Cow		Goat	Sheep
0	60.4	54	0	35.3	22.6
1	18.6	32.4	1-3	29.1	33.4
2	15.5	6.7	4-7	20.7	26.2
3	4.1	4.9	8-11	11.4	17.1
4	0.7	0.7	12-15	2	0.7
5& more	0.7	1.4	15& more	1.34	0

With regard to the small ruminants, 35% and 23% of the sample did not own goats and/or sheep. A third of the households have a maximum of 7 sheep and goats (Table 4). Small ruminant production is an important agricultural activity in Konso. The number of households without any kind of livestock accounted for about 2% of the total sample set, thereby indicating the importance of livestock to the study area.

In the study, another investigation was carried out on how the livestock was acquired by a household. On average, 47% of livestock types were obtained in the form of inheritance. Interestingly, the proportion of livestock purchased and leased in livestock sharing arrangements were nearly the same proportion: 27% and 26%, respectively (Figure 4.) A likely explanation for such type of contract arrangement is that it was done mainly for economic reasons; however, the social capital dimension plays an important role in the community. Farmers mentioned that one of the reasons for getting involved in sharing arrangement is to create relationships and ties with borrowers.

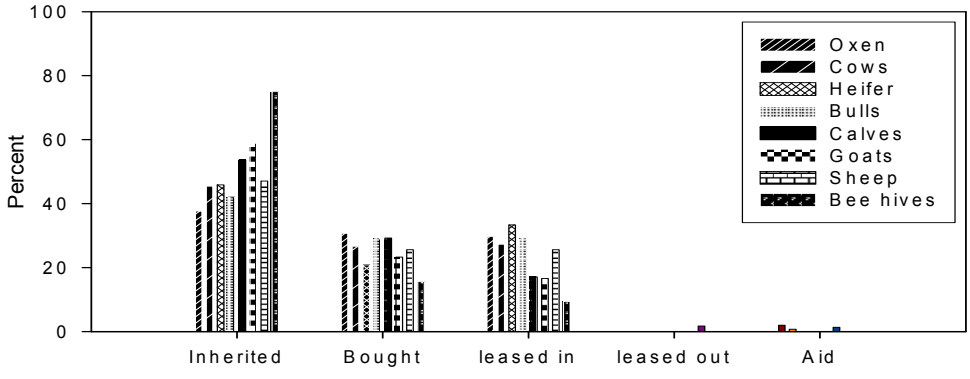


Figure 4. Forms of livestock ownership

Leasing is the culturally available means of acquisition of livestock for the poor segment of Konso society. Livestock sharing is one of the major means for acquiring livestock in the study area, and its arrangements can take different forms depending on the type of livestock. The following discussion regarding the types of livestock sharing arrangements were based on comments reported by the respondents and during group discussions. Agreements are usually indefinite in duration. Whenever the livestock owner feels that the recipient has not been properly caring for the animals, the lender can retake them. Most recipients prefer to share cows in order to attain or benefit from the milk. This also depends on the recipient's capacity to provide the required feed for the cows. As such, recipients with little livestock feed prefer small ruminants. In order to elaborate the facets of a typical livestock agreement involving a cow (or cows), consider the following example. An individual receives a heifer at breeding age, and he/she is entitled to use the milk. When a calf is born, however, half of the milk will go to the owner. If the heifer gives birth for a third time the recipient can use the milk for himself/herself, but the calf of the heifer will be the property of the owner.

Arrangements with oxen or bulls, on the other hand, are usually linked to the use of oxen power for ploughing. In this arrangement the recipient ploughs both his own and the owner's farmland, and provides feed for the ox. Arrangements involving small ruminants differ yet again. For example, if a recipient received a goat or sheep of breeding age, the two consecutively born male lambs will be given to the owner while the third one will belong to the recipient (i.e. the recipient will have access to one for every third of the offspring). If the first born lamb is female, however, it will belong to the recipient and he/she will be entitled to receive the first offspring, while the next two consecutively born offspring will belong to the owner.

In addition, any fattening arrangement with regards to oxen or bull will enable the recipient to get fifty percent of the profit, while the fattening of sheep or goat enables the recipient to get one-third of the profit when they are sold.

Investigating social capital requires an understanding of local social relations, systems of networking, sharing arrangements and other mechanisms. In most rural areas, social networks play a highly important role in mitigating the risks that households face with respect to livelihoods. The land and livestock sharing arrangements in Ethiopia, however, confer unequal benefits to participants involved in the agreement. Landowners benefit most in sharecropping because they receive the benefits of their land with limited investment, but benefit least in contracting because they are paid poorly for the use of their land. Livestock sharing arrangements are similarly imbalanced (CGIAR, 2007).

Despite the multiple contributions of livestock to the livelihoods of the Konso people, livestock production in the study area is constrained by technical and socio-economic factors (Table 5). The study has shown that a shortage of grazing land, a lack of fodder and disease problems in the study area have been identified as the major constraints. These factors tend to be common in traditional livestock production areas. The most important contribution of livestock to agricultural production in many parts of Ethiopia is the use of oxen as draught animals. However, in Konso the low number of cattle ownership could be attributed not only to the above mentioned factors and but also to the farming practice which is mainly hoe cultivation with the exception of one study site.

A combination of various types of feed from; crop residues mainly sorghum stovers, weeds, grass collected from cropping area and fodder from trees of native species from farmlands and near-by forests and by-products of local drink are all sources of livestock feed in the study area.. About 25 % of the respondents used local drink by-products as a feed, mainly for their cow(s), while, in the past, farmers restored the fertility of their land by fallowing for several years. As such, by linking livestock, fodder and nutrient cycling in a mixed crop-livestock system, the farmers are encouraged to raise livestock while also protecting their farmland and continuing to use it in a sustainable manner.

Stall-feeding, in the study area is the principal means by which livestock are fed at any season. Since the majority of households keep a relatively small number of livestock (mainly goats and sheep) alongside with cropping, and as identified in this study over 80% of farmers practice cut-and-carry systems for the stall-feeding of animals. Under the stall feeding system, manure can be easily collected from the stall-fed animals. The manure can then be used in maintaining soil fertility (i.e. often on crop fields located close to villages). However, as most farmers keep small ruminants, the quantity and quality of manure in sufficiently restoring the soil fertility is not known. Other concerns of the farmers which affected the productivity of the animals included the availability, quantity and quality of feed. Livestock feed supply during the dry season is limited (particularly in December-February), and farmers have to carefully manage their fodder trees and shrubs in order to synchronize the availability of feed with the seasons. During these periods most farmers rely on fodder tree and shrubs that are native to the area. Among other species, the most commonly used fodder tree and shrub include (in order of importance): *Terminalia borwnni, Rhus natalenis, Acacia asak, Balanites aegyptica, Cordia africana, Cajanus cajan, Berchemia discolor, Ehretia cymosa* and *Ficus spp*. Almost all farmers own, use, and rely heavily upon *Terminalia borwnni*. *Terminalia borwnni* provides the largest portion of livestock feed (over 90%) at any period, and particularly during the long dry periods.

Table 5. *Constraints to livestock rearing (n= 151)*

Constraints	Number of respondents that perceive the constraints as (1=highest to 5= lowest)							
	1	2	3	4	5	No livestock	No response	Rank
Lack of fodder	63	66	15	4	1	4	0	2
Shortage of grazing land	70	47	26	5	11	4	0	1
Disease prevalence	12	26	82	11	1	4	17	3
Lack of vet. services	2	4	4	63	13	4	63	4
Shortage of water	0	4	8	7	31	4	99	5

Even though fodder from trees grown on crop land is used as livestock feed, the respondents believed that both quantity and quality of livestock feed were limiting factors for many households in order to increase the number of livestock. During the dry season farmers are largely dependent on trees for livestock feed. Farmers grow fodder trees on farmland without causing significant reduction of the associated crop yield, while also gaining additional benefits such as fuelwood and enhancement of soil fertility.

4.3.3 Household labour profile and use in agriculture activities

In rural Ethiopia, the household division of labour and extent of involvement (e.g. in ploughing, sowing and harvesting) varies depending on the farming system, cultural setting, and economic activities in the region. In the northern highland areas, where cereal crops are grown major cultivation practices are mainly done by men. This is in contrast to the southern regions of Ethiopia, where the cultivation and processing of *enset* is conducted exclusively by women, and the cash crops are handled entirely by men. In the study area, the question of division of labour was addressed through a survey and focus group discussions held both with men and women. Based on the results, most farm activities (e.g. ploughing, sowing, weeding and harvesting) are jointly undertaken by both men and women (Table 6).

Table 6. *Household labour division in farming and home activities*

Type of activity	Age(6-15)		Age(16-45)		Age(46-60)		Mean	
	Male%	Female%	Male%	Female%	Male%	Female%	Male%	Female%
Ploughing	55	45	44	56	77	23	59	41
Sowing	55	45	44	56	86	14	62	38
Weeding	56	44	42	58	68	32	55	45
Harvesting	56	44	42	58	63	37	54	46
Cattle feed collection	53	47	41	59	64	36	43	47
Feeding cattle	47	53	34	66	57	43	56	54
Fuelwood collection	35	65	16	84	41	59	31	69
Fetching water	37	63	23	77	33	67	31	69
Livestock herding	41	59	25	75	59	41	42	58
Manuring	42	58	27	73	54	46	41	59
Marketing produce	41	59	37	63	68	32	49	51

The results show that the major farming tasks are slightly more influenced by men (58%, on average), however, the involvement of women in these tasks is about 42%. This value is higher than many other places in Ethiopia. The reason for this phenomenon is that ploughing and crop cultivation in Konso is done mainly by hand hoeing; thereby resulting in a higher demand for household labour than in a farming system using the ox plough method. It is also very important to underline that the involvement of women in those activities is also age related. At a younger age male involvement is to some extent higher than female involvement. At the ages of 16-45 years women involvement increases, and subsequently decreases again at the later ages of 46-60 years. This is because at a younger age women tend to concentrate more on household activities, while at the ages between 16-45 years women are in the time period of marriage (i.e. when they will establish their own families and jointly take these major farming activities). At a later age they again concentrate on home activities. Activities related to cattle feeding and fuelwood collection, fetching water and the marketing of produce, are mainly done by women. This implies that women in a traditional society shoulder multiple responsibilities. As in most rural communities, the task of fetching water and collecting fuel wood is also the duty of female and male

children. The only activity exclusively left for men is the construction and maintenance of terraces. Children are also involved in farming during the main rainy season and in livestock herding. They contribute and assist adults in different activities including farm work, housework, and also in PSNP. The general situation of the labour pattern appears to be that men have relatively low work burdens with increasing work load during the peak seasons. Women, on the other hand, are engaged throughout the year in addition to their regular household responsibilities.

4.4 Vulnerability context and trend

4.4.1 Brief history of drought in Ethiopia

Drought refers to a condition of low rainfall over prolonged periods, and denotes extreme scarcity of water resources. In Ethiopia, drought is defined differently and has different effects within different agro-ecological zones. Although drought is essentially a climatically induced phenomenon, its actual effects in a given ecological zone-and the viability of responses to it - will be mediated by ecological, social and infrastructural factors. When drought begins, the agricultural sector is usually the first to be affected because of its inherent dependence on rainfall. In addition to the climatic factors, communities' histories of coping with reduced rainfall and uncertainties, as well as the nature of mechanisms they have adopted over the years in response to drought, are also important factors in the community dealing with drought. People living in drought prone areas have been continuing their efforts to cope with drought conditions using their indigenous knowledge and means.

Dating back as far as biblical times there are references to severe famines in Ethiopia; With some references even referring as far back as 253 B.C. Famine incidences caused by drought in Ethiopia goes back to the 11th century. Droughts are the most noted cause of famines but frequently droughts are accompanied by epidemics and pestilence, invasions of migratory pests, as well as an upsurge in Ethiopia's own home grown pests. These include the Wello bush cricket, smut, stem rust, stem borer, shoe fly of teff, fungal infections, stryiga weed infestations and/or rodents.

The great famine which raged in Ethiopia from 1888 to 1892 was perhaps the earliest, and is one of the best documented cases in the country's long

history. Based on the work of Pankhurst (1985) the disaster was found to be a combination of natural calamities, a major epidemic of cattle plague, a harvest failure, and an outbreak of locusts. It was probably caused by a combination of a deadly invasion of rinderpest, which killed off the cattle needed for ploughing and drought, and yet another invasion of locust and army worm (Pankhurst, 1985).

Some analysts have also identified two notable crisis years in Ethiopia, the 1958 and the 1973 droughts, while others claim that during the 20-year period between 1958 and 1977, about 20 percent of the country was under famine conditions each year (Woldemariam, 1984).

Over the last decade or so, vulnerability has increased-from a mere 3% affected by food shortages during the 1974 drought to 18% of the population affected in 1984/85.The persistent drought that occurred in Ethiopia during 1984-85 has severely affected crop production and livestock in the country, and has resulted in serious consequences with regards to food security and livelihoods of a large segments of the rural population. The cost in human suffering, as well as to the already impoverished economy, has been growing with each successive cycle of drought. Rahmato (1991) states that, all in all, the period from 1974-84 may be considered the decade of the Ethiopia holocaust: mass starvation, bloody rural insurgency, a crippling war with a neighbor, mass urban terror, wide-spread epidemics, and nothing like this (or on this scale) has occurred in the country's modern history.

The loss of the resource base among poorer farm and pastoral households has led to serious economic deprivation, especially in the north and the east. The famine of 1975, which was the result of cumulative effects of the preceding years, primarily affected the northern regions of Wollo, Tigray and Eritrea, as well as eastern Hrarghe. Sen (1981) describes the situation, noting that the 1971-72 rains were erratic, but the big drought that affected north east Ethiopia, particularly Wollo, was largely the result of the failure of the main kiremt–rains in mid-1972, followed by the near total failure of spring-belg-rains in early-1973. The former had disastrous effects on the lowlands, while the latter mainly affected the highlands. This has clearly resulted in crop production failure, and has resulted in food shortage in most of the areas mentioned above. It seems difficult to get precise statistics about the number of human deaths, with estimates varying between the authors. On the whole, 93% of the sheep, 90% of the cow, 86% of the goats, 72% of

the camels, 60% of the donkeys and 95% of the mule have died as a result of the erratic rains of 1971-1973 (Woldemariam, 1984). The first few years following the 1974 drought were marked by what seemed to be encouraging signs of recovery in the major food growing areas, including the affected highlands. The generally positive impact of the international food aid, favorable weather, and the land reform helped produce relatively good harvests in 1975/76 and 1976/77 (Rahmato, 1991).

A decade later in 1984/85, Ethiopia was again faced with another calamity of famine. This famine had a wider geographical impact and expanded to areas which once were famine-free. This famine also received world-wide attention and a massive out pouring of assistance from the world. In spite of this assistance, many people died form malnutrition and disease that accompanied living in crowded conditions in relief campuses.

4.5 The case of Konso

Konso did not escape the 1973/74 drought which occurred in large areas of the country. According to the respondents, before the drought of 1973/74, the rainfall had been declining for three consecutive years. In 1983/84 Konso was severely hit by drought. After the fall of the Emperor, crop production in Konso continued to decline, but 1985/86 was the time when the highest crop production was obtained. This coincided with an epidemic where up to five persons died in some households and, in one of the study sites, a total of 70 people. However, the year 1999/2000 was a good harvesting time for Konso farmers. After this time crop production continued to decline. Konso has been frequently affected by food shortage, and in year 2000 it was one of the areas in the country worst hit by drought (Watson, 2004). Starting in 1992, crop production remained low until 2004/05 (which is now considered to have been the best season in Konso).

The respondents indicated that from the final periods of the Emperor until the end of the Derg period, they produced sufficient crops every fifth year. Since 1993, however, the frequency of a good harvesting season has been declining and the trend is worsening; with drought occurring every two to three years. In general farmers said there were only two seasons that farmers were able to get good harvests since 1974.

The general consensus of the respondents was that rainfall amount and its distribution, as well as land productivity were much better in the earlier periods than the present. Most respondents associated these changes with a reduced cover of forest and continuous over-cultivation of plots as a result of a growing population.

The following drought occurrences were identified from the group discussion with elderly people within the study area. The name of a specific drought period was given by the local people in relation to where or whom the grain was brought at the time of drought.

Name	Period
Tawso	Before Emperor Menilk II
Lota Bura	Before Emperor Menilk II
Lota Bula	Before Emperor Menilk II
Herma Qalto	At the time of Emperor Menilk II
Tekela Harmasho	At time of Italian invasion
Lota Zeyse	At the time of Emperor Hailselassie
Qara Sherto	1957/1958
Lota Kewso	1974/1975
Lota Kochoro	1983/1984
Lota Moko/Lota Farm	1998/1999
	2003/2004
	2007/2008

4.6 The trend over time

The impact of protracted drought has resulted in a continued reduction of the food stocks and assets of households. The people are chronically food insecure experiencing food deficits in any given year irrespective of the impact of drought. The food stocks across many households have declined and cannot last beyond six months. The gap has to be bridged by various means.

Individuals in the studied households indicated that agriculture alone could no longer support the people. Farmers indicated that food insecurity is caused by factors such as recurrent drought, population pressure, land degradation and low agricultural productivity, and declining livestock as a productive asset. Pest and disease outbreaks such as Striga hermonthica, army

worm and leaf blight are associated with drought occurrence. As a result of drought and inter-annual rainfall variations, farmers in the last three decades have been shifting towards adaptable varieties of crops. For example, the sorghum varieties, locally known as *Shulaya* and *Dishkara*, which only grow well with sufficient rainfall, are being replaced by the *Kedano* and *Huata millet varieties*. For example, one farmer said that "Konso experiences two rainy seasons, however if the shift of *Hageya* (i.e. the long rainy season for Konso) from time to time towards the short rainy season continues as what is happening now, and he fears that the time when the two rainy seasons merge into one will not be long".

Since the late 1940s, famine caused by drought has hit Konso every 10 years. Since the 1960s, the time-span has lessened. Now the trend is worsening, with famine occurring every two to three years. Konso is one of the *Woredas* in the SNNPR classified as food insecure.

The Konso land use and traditional conservation systems have helped to protect the soil and to halt rapid land degradation. Different types of soil and water management practices, the use and harvesting of trees and perennials, and the incorporation of livestock with crop farming have enabled them to sustain the population on fragile soil and under unreliable rainfall conditions. The Konso highlands provide striking contrasts in terms of land use intensity when compared with the surrounding lowlands. The agriculture practice has been intensive, based entirely on subsistence, and this capability has been declining over time. The coping strategies are more constrained now than before. The conservation efforts that were successful in coping with harsh environmental conditions and erratic rainfall, as well as the traditional values given to them, may decline due to an inadequacy of the traditional land management systems to sustain subsistence livelihoods. The reason is that the intensification of agricultural practices is based on hard labour and natural inputs. A rapid population growth combined with traditional technologies and as well as limits on the availability of land for expanding agriculture- have all contributed to a decline in productivity.

In marginal drylands, the environmental and economic productivity is low. As a result of high rainfall variability combined with poor access to economic activities, people living in these areas often suffer from poverty, and are vulnerable to threats of food insecurity. People living in these areas develop traditional systems of management in order to benefit as much as

possible from their available resources. In spite of the continuing efforts of Konso farmers to adapt to the environmental, social and economic changes, the mechanisms they have been employing have gradually become less adequate at absorbing and bouncing back from shocks than they were previously. They are exhausted from drought and other economic stress, yet farmers from all socio-economic categories share almost an identical view on the cause: an unreliability of rainfall and drought as an act of God in response to sins (in particular, dishonesty and lack of respect to elders of the community).

4.7 Rainfall characteristics in Konso

In Konso, nearly all the households are dependent on rain-fed agriculture as the basis for their livelihood. During the discussion with the community, and also based on the survey results, it was found that the local communities perceived changes. These perceptions included an awareness regarding declining trends of rainfall amount, and the increasing variability/unpredictability of timing of rainfall occurring in their area. Farmers also see these changes as the major causes of frequent crop harvest failures, pest and disease outbreaks and food insecurity. In fact, in accordance with farmers' perceptions, a rainfall deficit in such drylands endowed with limited natural resources would have substantial impacts if changes occur beyond the normal patterns-even over short period of time. It is also important to note here that there are number of other biophysical factors that influence crop growth and harvest. For example, other factors that influence the available moisture include aspects such as the physical and chemical properties of the soil, land management, topography, vegetation, etc. The influence of rainfall conditions on crop production is well understood, however; the impacts could be exacerbated by socio-economic factors and livelihood resources and strategies. As such, the purpose of this section is to mainly discuss the aspects of rainfall conditions as they relate to the above mentioned perception of the community in the study area.

The rainfall data used to explore the general rainfall conditions of the study area was obtained from the Ethiopian Metrological Services Agency (EMSA). The rainfall station is located within Konso town. The data covers the period from 1971-2006. During this period, remarkably, in 95 %of the months rainfall was recorded, with December being the driest month. As shown in Figure 5, the rainfall regime prior to the mid 1980s was

considerably different than the regime of the most recent two decades. The years from 1974-1984 exhibited a lower rainfall trend and they are generally classified as slightly below average rainfall years. With the exception of 1995 and 2000, the figure indicates that the annual rainfall for the study area has shown a general trend including increments with respect to both amount and variability of rainfall for successive years since 1987. The highest annual rainfall recorded during this period was in the years of 1989 and 1996/97, where a level of slightly over 1000 mm was attained. These results are exceptional in nature with regards to the study area. The lowest rainfall was recorded in 1984. Over the entire period of 1971-2006, the overall mean annual rainfall was 596 mm. Rainfall was generally below the long-term mean value for the 70s and mid 80s, while in the recent two decades it was above this value thereby indicating that fairly good rains were received in the area.

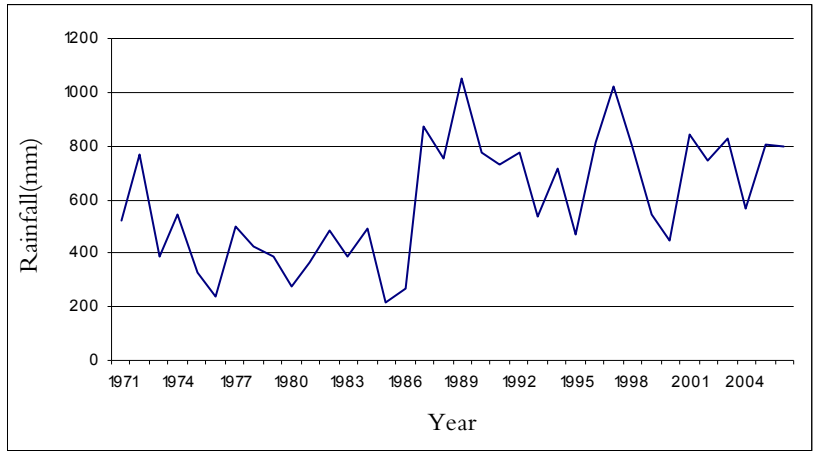


*Figure 5.*Annual rainfall at Konso 1971-2006

Konso has a bimodal rainfall pattern, with the long rainy season occurring between February and April and the short rainy season occurring during September and October. Based on data over the 36 year period, the average rainfall quantity during the long rainy season was 222 mm, with a standard deviation of 116 mm. Over the same period, the average rainfall quantity for the short rainy seasons was 143 mm, with a standard deviation of 67 mm. The coefficients of variation for the main and short rainy seasons were 52% and 47% respectively (Table 7). As can be observed from the table, the fluctuations are caused mainly by high seasonal and annual variability.

Table 7. *Rainfall variability for the long, short rain season and annual rainfall*

Measurement	Main rain seasons	Short rainy seasons	Yearly (over 36 years)
Mean	221.9	142.8	596.4
Standard deviation	115.7	66.7	226.03
CV %	52	46.7	38

The rainfall variability in the study area can also be better understood through an analysis of the deviation from the mean rainfall condition. A high deviation from the mean can also affect the agricultural activities in a negative manner. Between the 1990s and mid 2000s, rainfall was above the long-term mean. Figure 6 further illustrates the deviation from the mean rainfall conditions in recent decades. When looking at the rainfall condition from 1971-2006, a clear pattern of difference could be observed both for the total annual rainfall and the long rainy seasons (Figure 7 and Figure 8). The annual rainfall during the years from 1971-1987 generally showed a consistently negative deviation from the mean value, and exceeded more than 50 % for some of the years.

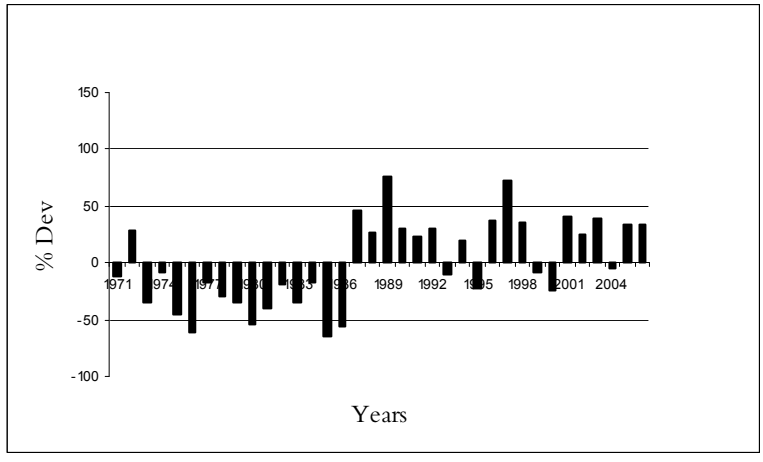


Figure 6. Percent deviation of annual rainfall from 1971-2006

The primary reason for the occurrence of drought in the study area has been explained as the failure of February–April rains. Similar to the annual rainfall, the long rain season also showed an increase in rainfall amount. The years between 1988 and 2006, the annual rainfall showed a positive deviation at times reaching up to 70%. Based on Figure 7, the deviation for the long rainy seasons appears as if the values reach as high as 125% or so. These results could indicate that there is not as much strong evidence supporting drought persistence in the study area over this period. However, even though the positive deviation from the mean could indicate better conditions for plant growth, there was a very high variability between the years. These seasonal fluctuations are extremely critical in relation to planting time, growth stages, and survival of crops; i.e. during the germination, flowering or maturity stages of the crop. This indicates that the effectiveness of rainfall depends almost as much on its timing as it does on its quantity during the cropping season. This suggests that in dry agro-ecological conditions little variation in timing and amount of rainfall at certain stage of crop growth is detrimental to agriculture productivity.

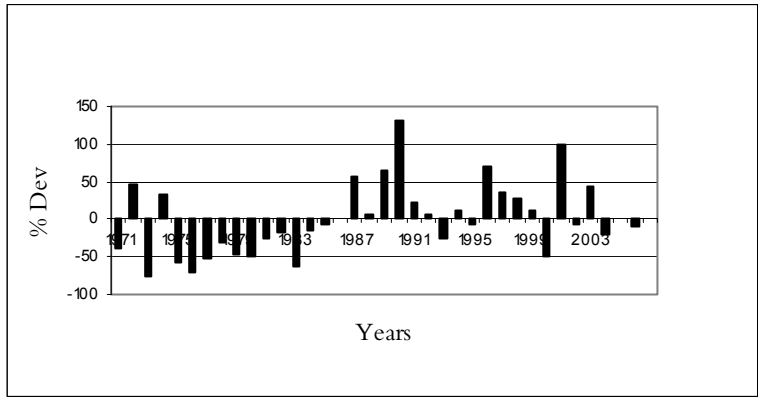


Figure 7. Percent deviation of the long rainy season based on 1971-2006 mean for the season.

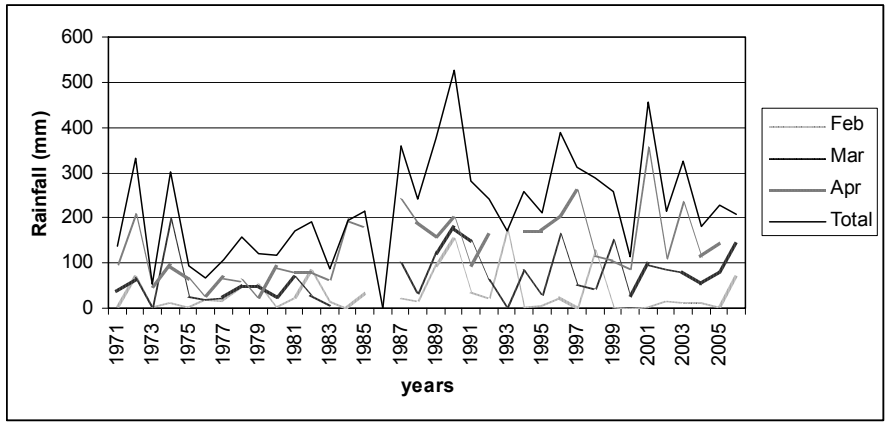


Figure 8. Long rain season rainfall 1971-2006

Overall, the above analysis showed that there have been no significant changes or trends in annual rainfall since 1987. It is clear that rainfall fluctuation is a major constraint to agricultural activities in the study area. As almost all farmers are engaged in rain-fed agriculture, they are faced with seasonal and inter-annual rainfall variability. Such variability directly and indirectly affects the production of crops. The prediction of the rainfall pattern - i.e. the onset of rainfall, how long it will last and whether (or not) the rains will cease in a particular season-is difficult for farmers as the

fluctuations are occurring frequently. This year to year rainfall variability also makes farm management strategies more complicated, and prevents farmers from taking advantage of opportunities in good years; that is, farmers are less confident to invest in inputs due to the risk of rainfall variability and the associated risk of crop failure (i.e. any long dry spell during the flowering and maturity stages would inevitably result in yield reduction or complete crop failure). The findings suggest that the major source of frequent yield reductions and crop failures occurring in the area - at least in the last decade and a half-is largely a result of increasing variability in normal rainy years with dry spells occurring at a critical stage of crop growth. The findings also showed that the amount of rain for the long rainy season did not display any significant changes. As such, this variability and unpredictability in rainfall further undermines crop production and can have implications towards developing practical responses which enable the local community to adapt to such changes.

5 Livelihood options and adaptive strategies at community and household levels to changing socio-economic and climatic conditions

5.1 Strategies at community and household level

The Konso farming system utilizes a multiple cropping approach which incorporates a combination of different crop varieties, trees and/or livestock. To elaborate, this technology combines mixed plants of leguminous and non leguminous perennial vegetation with several cereals, while also integrating different varieties of root crops with livestock. This mixed cropping pattern allows the farmers to produce different types of crops; thereby reducing the likelihood of total crop failure (i.e. stemming from a wide-range of issues such as bad weather, unfavorable soil properties, shortage of land, and/or pest and diseases). The backbone features of the Konso agricultural system- i.e. indigenous soil conservation, water harvesting, diversion of floods from rivers to fields, and tied ridges - have evolved through years of experience, and have been continually maintained in order to tackle major crop production constraints, as well as to ensure both the system itself and agricultural production are functioning in a sustainable manner. One of the most important practices that farmers employ to maintain soil fertility is through the use of dung as a fertilizer. In Konso, livestock are kept at home, and dung-be it from cows and/or small ruminants-is used exclusively for land fertilization. This resource usage strategy is in contrast to many other parts of Ethiopia, where dung is used as a primary source of fuel. It should also be noted that, in Konso, household wastes are also used to replenish soil fertility.

5.2 Intensifying land management practices

The Konso people have been isolated from the surrounding pastoralist ethnic groups. This is largely due to historical conflict, and the predominant need to stay at their place and defend their territory. Konso used to be an exemplary area where marginal cropland could be rehabilitated to feed people. This phenomenon was associated with the locals' innovative land management practices, which have included aspects such as: terracing on the highlands, the construction of micro-basins on lowland farms, the sustainable application of organic fertilizers (cow dung, ashes and other household garbage), shrub fallowing (where *Cajanus cajan* is left on the crop land for a year or two), and the growing of different crops according to plot-specific soil properties. These strategies have also been complemented by practices that are established within Konso's specific agricultural context, including practices such as the diversion of water to farms, the cultivation of fruit trees on wet area and flooded river banks, and time/climate-specific planting procedures (e.g. the dry seeding of sorghum just before the on-set of the rainy season followed by sowing of maize, wheat, soybean and other crops during the rainy seasons). In addition a land which has been producing crops is often used for growing trees (i.e. by growing wildings or tree seedlings) if the land's crop production capability has ceased.

Community level cooperation has been an important source of labour input for farming activities. The *Parka* and *Alumela* working groups, as well as clan-and kinship-based cooperation, are common during terrace construction and maintenance, as well as during land cultivation and weeding. Village-based cooperation has also occurred following difficult crises and depending on the extent of crop land damage (e.g. following severe damage resulting from heavy flooding).

In the past in Konso, there were two primary sources of food during drought periods. The first source was the untouched forested areas of land which were often distant from the community. Here, people collected edible fruits, roots and leaves. Today, these resources have been used in almost their entirety. The second source of food during periods of drought was on the top of hilly areas where trees and shrubs, which had been deliberately left as source of food during drought years. These perennials, however, have now been replaced by food crops. In addition, further adding to the potential scarcity of food resources during periods of drought, the

edible wild fruits and roots (locally known as *Pagana, Kocheta, and Kansata*) have disappeared from farmlands in order to give way for crops and trees. Cotton crops, which were once a cash crop for the area, have also now been replaced by subsistence crop. All these factors indicate a shift towards a growing requirement for subsistence crop growth in Konso, thereby displaying the livelihood vulnerability of the local individuals.

The traditional stone terraces, biological conservation practices, and the intensive agricultural practices that have served the community in the past have now become inadequate to enhance-or at least sustain–Konso's agricultural productivity. Community level cooperation in the farming activities, which is based on labour exchange and organized according to mutual assistance, does not involve any payment. Based on the results of this inquiry, the growing monetization of labour, it now appears that people are slowly becoming unwilling to tie themselves to working all day for just food and drink. This is particularly evident when it comes to tasks that require heavy labour. Moreover, construction of a new road in Konso, as well as other construction works in the area, have provided the opportunity for farmers to get a better daily wage than when working on other farms. As a result, this situation has created a tendency for farmers to demand an equal wage (as paid for the construction works) when engaging in farm labour. And, while this diversification of employment in Konso can be viewed as a positive in some regards, the increased monetization of labour strongly affects the poorest segment of the Konso community. These individuals, that is, those who cannot afford to hire labour, become the primary victims of - and bear the largest burden from-this monetization of labour, as the opportunity/ability to support their farms is severely lessened.

Another labour-related issue in Konso is that women work as hired labourers on farms, but for a lower wage than men. Currently, the wage is not more than Birr 7 per day for women. As such, instead of working on farms, women are shifting towards the collection and sale of fuelwood. When conducting this work, women can earn up to Birr 14; i.e. often more than double that which is earned when working on farms. This situation has also led to an increased wage labour rate on farms, thereby compounding the labour issues for Konso's poorest population.

5.3 Diversifying crop mix and shift to drought tolerant crops and varieties

Konso *Woreda* benefits from bimodal rainfall. The first rains (i.e. the main rains) are from February to April, whereas the second rains are typically from August to October. Each cycle is usually responsible for about 80% and 20% of the annual production respectively, with farmers growing mainly sorghum, maize, *teff,* barley, finger millet, and haricot beans. The farming system that is being practiced in the *Woreda*, particularly in the middle altitude, is intercropping three or more crops and growing together. The farmers are intensive agriculturists who subsist primarily on sorghum (several varieties) intercropped with other food crops and trees (Figure 9).

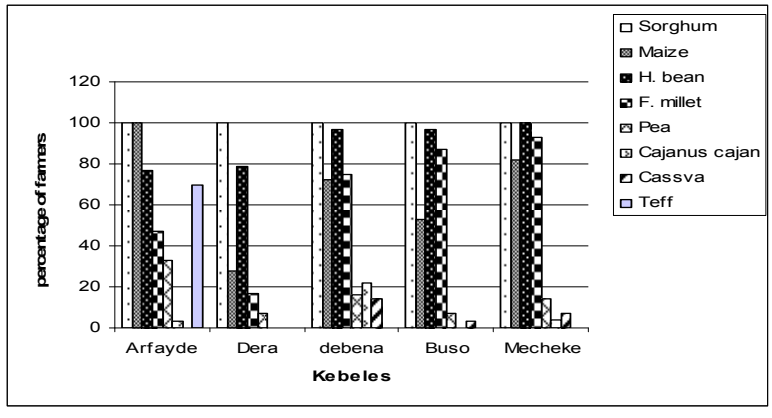


Figure 9. Types of crop grown by farmers

The respondents' perceptions and preferences on four commonly grown food crops in the study area was assessed. Farmers were asked to rank the types of food crops based on a number of criteria suggested by themselves (Table 8). As the information collected indicated, the four major agricultural crops (i.e. sorghum, maize, finger millet and haricot beans) were predominantly grown together. Results from the ranking exercises showed that sorghum is the most important crop; followed by finger millet for the mid and the highland area. Maize was viewed as the most preferable crop in the lowland areas of Konso.

Table 8. *Ranking of farmers' preference of food crops*

Crop Spp Criteria	Sorghum (*shuleya)*	Haricot bean	Finger millet	Maize
High Production	5	5	8	6
Shortest time for harvesting	7	9	3	7
High drought resistance	7	1	10	2
Disease resistance	9	3	8	6
Pest & disease resistance during storage	10	4	9	6
Less expense and labour requirement to produce	7	9	4	6
Quality	5	7	7	7
Higher price at market	7	7	7	7
Total	57	45	52	45

In addition to the ranking exercise, the farmer's crop preference was discussed further during group discussion. During these discussions, farmers raised additional reasons for their preference of sorghum; not only in terms of grain yield, but also its tolerance to drought. As such, it was found that sorghum was (and is) the major staple crop in Konso, and is prepared to make *cheka* and *kurkufa*; a local drink and food, respectively. In addition, due to its adaptation to dry agro-ecosystems, sorghum is critical in maintaining the household food supply.

Based on the findings, farmers in Konso use a wide variety of sorghum, and select particular species depending on specific site conditions and the production objectives. This approach also results in the potential opportunity/benefit of growing sorghum with different qualities, and subsequently reaping the benefits from the different types. For example, one type may be good for animal feed, with another being good for drought and disease resistance. Most improved varieties mature earlier than local varieties, often before the end of the rainy season. This being said, it was found, however, that the susceptibility to grain moulds (particularly during storage), greatly limited the adoption of improved varieties. Based on the results, another major constraint to sorghum production was Striga, a weed that inhibits plant growth, and thereby reduces yields and, in severe cases, causes plant death. And while this weed is an obstacle to sorghum production, through the site-specific development of agricultural knowledge and practices, the farmers indicated that they had observed a variety that could

withstand this weed. In addition, the farmers indicated that increased application of manure suppressed the growth and eventually killed the weed. As such, it can be seen that the Konso farmers have developed site-specific approaches to sorghum harvesting; they grow multiple varieties to meet a range of different objectives in addition to the goal of maximum grain yield.

The survey study in this inquiry attempted to compare crop (yield) production trends, particularly with respect to sorghum in three periods; 1990-1999, 2000-2004, and 2005/06. The data for the first and second periods was collected from the survey, while the data for 2005/06 period was supplemented with sample farm plots during the harvesting season. Results from the survey confirmed that sorghum was cultivated by almost all the interviewed households, and that it occupied more land than any of the other crops grown; with this land area progressively increasing (Figure 10).

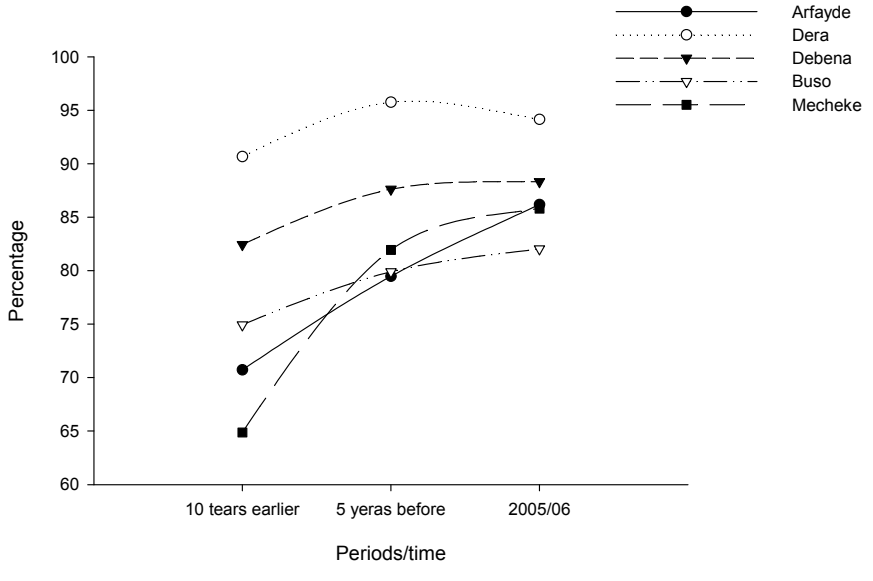


Figure 10. Changes over time of the proportion of sorghum in the overall crop yield

Based on the results, sorghum yield was much lower in the last five years than the yield values from the 1990s. However, most farmers expressed that the period of 1990-1999 was only an average harvest season; and indicated

that only 1995 could be considered as a good harvesting season. As shown in Figure 11, the average actual/total crop harvest of sorghum yield for all samples declined by 55% in the second period (i.e. 2000-2004). Moreover, farmers said that during severe drought and when crops are infested by pests and diseases the loss could reach up to 100 percent. However, in the third period (2005/06), which was considered by the farmers to be a relatively better harvesting season, the results indicated an increase in the yield by about 63% over the second period. One of the study sites, Arfayde, showed a higher actual harvest due to a larger holding of crop land than the other sites. In any case the average sorghum yield per hectare was found to be much lower than the national average which is about 900 kg per hectare.

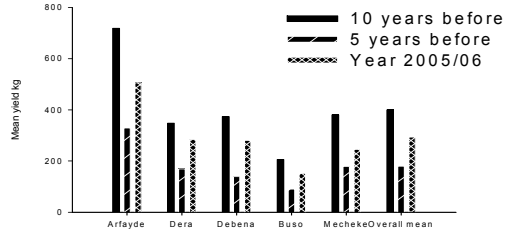


Figure 11. Trends in household total sorghum yield over time

In many parts of Ethiopia, due to variations in rainfall availability and distribution, subsistence agriculture is characterized by significant fluctuations in yield and production. One of the primary causes of household food insecurity in Ethiopia is the presence of production risks in the form of drought and pests. These risks result in frequent crop failures, and thus reduce agricultural production and incomes (Dercon, 2006; Devereux, 2000). Widespread drought can also lead to crop failures, often causing an associated deterioration in food security. Konso has been under major environmental stress occurring at different times and over a long period of time. These environmental stresses have resulted in low agricultural productivity and economic loss. Based on the interviews and survey, the majority of respondents, in most years, do not produce enough sorghum to meet family requirements. The perceptions of the respondents were diverse, however, all indicated that the major factor contributing to the variability

and decline in sorghum (and other crop) production over the past two decades has been the decline in rainfall quantity, and changes in rainfall distribution patterns. Other farmers associated the decline in crop yield productivity with soil fertility issues, pests and diseases, and/or land shortage (Table 9).

Table 9. *Reason for crop yield decline and variability*

Variable(constraints to reduced crop yield)	Response percentage
Shortage and poor distribution of rainfall	96
Soil fertility decline	48
Continuous farming	52
Shortage of land	9
Pest and diseases	51
Lack of input	7
Increasing population	8

Through an analysis of the data, an attempt was made to understand the consequences between crop yield reduction (and fluctuation) and the extent of food crop sufficiency for a household. Two objective methods of food security measurement have been widely used in most food security studies. The first method is to estimate gross household production and purchases over a period of time, and estimate the growth or depletion of food stocks held over that same period of time. It is then presumed that the food that has come into the household's possession and subsequently "disappeared" has been consumed. The second method is to undertake 24-h recalls of food consumption for individual members of a household, and analyze each type of food mentioned for caloric content (Maxwell, 1996). The former method is most often utilized by economists, with the latter typically applied by nutritionists. In this study, the former method was used. The quantity of harvested sorghum was used as the index food, as it is the major staple food in the area. and considering with that of the average calorie intake recommended by (FAO, 1998) 2100 calories/person/day which is the equivalent of 500 gm (for many cereals) and in this case sorghum /person/day what is recommended to be enough for their household consumption (Figure 12).

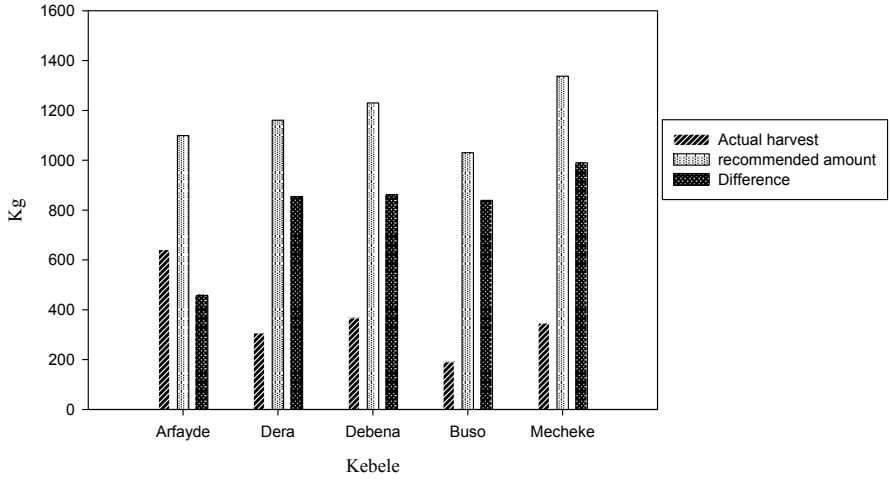


Figure 12. Farmers' actual crop harvest and demand

One of the most widely used indicators for food security is the number of months a particular household can feed its members. This was used as a criterion during the study in order to classify whether a household is food secure or not. The results of the study showed that even in the good harvesting seasons, only 67% of the households were able to cover their household food requirements for a 10-12 month period (Table 10). The remaining households suffered from a food deficit for 3 to 9 months per year. During the bad years, the situation gets worse when only 75% could cover up to three months while 2 % of the better off could cover 9-12 months.

Table 10. Percentage of households that can cover the food requirements in different harvesting seasons

Harvesting season	Number of months covered in a year			
	0-3	4-6	7-9	10-12
Good harvesting season	1	6	26	67
Medium harvesting season	9	26	57	7
Poor/bad harvesting season	75	18	5	2

Consequently, the results indicate that food insecure households start rationing available food to the next season. If the situation seems promising, they will slowly raise consumption towards the coming cropping season. Because of the frequent uncertainties the Konso households face-for example, a fear of crop failure in subsequent cropping seasons–at times, pest infested grain was found in their storage areas due to prolonged storage. From the results, it is reasonable to assume those who could sustain their household food requirements for less than four to six months (i.e. a proportion of up to one-third of the total population in the sampled areas) are living under serious food deficit conditions. These results can be regarded as an indicator for an urgent need to investigate a means to create conditions of self-sufficiency in food production and/or to encourage other means of income to secure access to food.

5.4 The growing importance of non-agricultural activities

5.4.1 Non-farm activities

Livelihood diversification is a key strategy for the maintenance of sustainable livelihoods. In Ethiopia and Malawi these diversification strategies include handicrafts and local drink brewing (Bryceson, 2000; Ellis, 2000). The literature on livelihood diversification is characterized by a wide range of terms and definitions. For the purposes of this paper, however, the following definition of livelihood diversification, as defined by Ellis (2000), was applied: rural livelihood diversification is defined as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living (Ellis, 2000).

Households and individuals can diversify livelihood portfolios in different ways. Generally speaking, however, the basic alternatives in rural livelihood diversification can be classified into three categories of activities producing income generation. These include: farm activities, off-farm activities, and non-farm activities. These classifications are useful to make sense of the nature of the choices entailed within rural livelihoods diversification processes.

Ellis (2000) defines farm income (or activities) as revenue generated from own-account farming; whether farming occurs on owner occupied land or on land accessed through cash (or share tenancy). Farm income also includes

income from livestock. Off-farm income (or activity) typically refers to wage or exchange labour on other farms (i.e. within the agricultural sector), where labour payments could be in cash or kind. It may also include income obtained from local environmental resources such as firewood, charcoal, building materials, wild plants, and so on. Non-farm income (or activity) refers to such income sources as wage or salary employment, non-farm rural self-employment (i.e. business income), rental income obtained from leasing land or property, remittance, PSNP/food-for-work, infrastructural building programs, and/or agricultural wage labour on private farms.

Livelihood diversification takes place as a result of a continuing economic, social, and environmental process. Within this context, people diversify their livelihood strategy by adopting a range of activities. However, livelihood diversification efforts vary depending on location and are influenced by factors such as: available assets, income levels, social relations, etc. Based on the study results, in spite of the remoteness of the area and the scarcity of job opportunities, a considerable proportion of the households in Konso were engaged in both non-farm and off-farm activities.

To elaborate, the results from this study indicated that one of the most important activities in Konso was within the non-farm category. More specifically, these income sources were typically in the form of wage labour in the small town of Karate and/or in neighboring districts. The self-organized labour group called *Alumela,* provided hired labour mainly in off-farm activities. Trading or small business, artisanal work, such as weaving, pottery, brewing local drink for sale and those engaged in regular daily labour as the only option and seasonal migration. In addition, the results indicated that most people in the study were involved in PSNP and labour-based infrastructure projects. The importance of these activities, in terms of their contribution to household cash income, is discussed in greater detail below.

Table 11 displays the main income diversification activities that were being undertaken by all adults (aged 6 years and older) in the research sites. When considering the age groups of 16-45 years and 46-60 years, the findings indicated that the proportion of the male population involved in daily labour was about 47% and 40%, respectively. When considering the participation of women in similar activities within the same age categories, the values were 25% and 17%, respectively. For the wider age category of 6 years and older,

the total percentage of the male and female population involved in income diversification strategies was approximately 31% and 18%, respectively. In total, the overall involvement for both sexes over the age of 6 years was 24%.

It is necessary to underline here that the majority of the young age group 6-16, as well as females in age group 16-45, have been participating in safety net programs which are temporary in nature and have different objectives. Even then, when considering the above results, the involvement of women in income diversification - particularly with respect to daily labour and the contribution to household income-has had positive implications on livelihood diversification. These implications, however, are often overlooked.

Table 11. *Household members' involvement in daily labour activities by category and sex*

Age group	Daily labour involvement							
	Male				Female			
	Number in the age group	Number involved	% within age group	% of the total	Number	Number involved	% within age group	% of the total
6-15	161	17	10.6	4.5	147	9	6.1	2.3
16-45	183	87	46.5	23.3	228	57	25	14.5
46-60	30	12	40	3.2	18	3	16.7	0.7
Total	374	116		31	393	69		17.5

A comparison of the daily labour opportunities between *Kebele*s was also conducted. Table 12 presents these findings. The results have shown that as high as 31% of the households in Dera have been involved in daily labour, while in Debebna only 10% were involved. This difference in labour involvement is likely a result of the location and proximity of the *Kebele*s to small towns. For example, Dera and Buso *Kebele*s are located very close to small towns while Debena is far from town and tended to be more heavily engaged in small trades. In addition, it was found that the decision to participate in non-farm and off-farm employment in the study area was also influenced by low farm output and available manpower in the households.

Table 12. *Daily labour involvement between villages*

Daily labour	Kebeles									
	Arfayde		Dera		Debena		Buso		Mecheke	
	Number	%	Number	%	Number	%	Number	%	Number	%
Involved	40	21.7	57	30.5	24	9.8	38	21.7	27	13.3
Fit but not involved	69	37.5	71	38.0	122	49.6	72	41.1	106	52.2
Unfit being below working age	73	39.7	57	30.5	96	39.0	63	36.0	68	33.5
	2	1.1	2	1.1	4	1.6	2	1.1	2	1.0
Unfit due to health or aging										
Total	184	100.0	187	100.0	246	100.0	175	100.0	203	100.0

Because rural households in dryland area typically cannot obtain sufficient food and income from farming alone, they develop and depend on a diverse 'portfolio' of activities and income sources. Diversification takes place in order to overcome risk and seasonality in natural resource-based livelihoods, but it also reflects the increasing inability of agriculture to deliver improving livelihood. Livelihood diversification is essential to poverty reduction, food security and improved incomes. Diversification is the "creation of diversity as an ongoing social and economic process, reflecting factors of both pressure and opportunity that cause families to adopt increasingly intricate and diverse livelihoods strategies" (Ellis, 2000). The degree of diversification (agricultural/non-agricultural diversification) may relate to resource endowments available and risk associated with alternatives. This context imply that the complex interplay of economic, social, cultural and political dynamics in rural Africa becomes all the more essential for effective policy formulation (Scoones, 1998, Bryceson, 2002).

With respect to the link between remoteness and livelihood options, Ellis (1999) pointed out that remoteness is typically associated with greater poverty and fewer livelihood options, and therefore it may be valid to target remote locations rather than those places already well integrated into diverse economic activities.

Household capacity, lack of required skill, social relations, limited opportunity, poor infra-structure and services and absence of institutional support are among the various constraints that limit non-farm income generating opportunities in the study area.

5.4.2 Seasonal migration

Due to low levels of economic diversification in rural Konso, non-farm employment opportunities are limited. Many are involved in seasonal migration outside Konso. Seasonal migration has been one of the most common employment strategies in the study area, and it is often those with small land holdings and no alternatives that migrate for daily labour work. Most respondents associated seasonal migration with reduced farmland holding and a decline in land productivity which has made them unable to fulfill the household food and income requirements. As such, for the poor, this was the only option. It was also mentioned by respondents that people migrated not only to bridge the gap for household needs but also with specific objectives in mind; such as to achieve their cash needs for marriage

expenses or to construct a new house. In addition, based on the results of the study, seasonal migration was typically undertaken by the middle and better offs in order to invest for a particular purpose. Others migrated to pay earlier debts.

Household size was not a determining factor with respect to seasonal migration; rather, in poor households the demographic structure was crucial in the planning of seasonal migration. Poor households with many underage children did not benefit much from seasonal migration. For example, a household head who migrated in search of non-farm employment, and whose family has no sufficient labour to conduct the farm activities, could make a request to relatives and/or friends for assistance, or he could send money to the family to hire labour. Otherwise he could establish an agreement with the *Alumela* working group to do certain farming activities and the group would be paid after he comes back. While these options are available, however, the reality of the situation is that those engaged in seasonal migration are typically owners of small areas of land that can be managed by labour available in the household. Migrants do not alienate themselves from their land. Also, most leave their areas after having completed the land preparation, which is the heaviest job in farming the practice in view of the mechanical hoeing involved.

The consensus from the discussions held with individuals, with regard to the impact of migration on labour availability and farming, was that labour was not a constraint but land was. As such, the view that seasonal migration could adversely affect agricultural production by reducing available labour does not seem to apply in Konso. This might be particularly true in densely populated areas. In drought periods, members of households migrate; leaving behind the elderly household head as well as the wife and young children.

It appears that the migration season is usually during the dry season and sometimes during the weeding season when there is little work. Typically, individuals are away for periods of three to six months. Most people migrate during the months of November, December, January and at the end of April. Few individuals are able to go during August and September (i.e. the time of sorghum harvest from the short rainy season). The most frequent towns people migrate to are Yabelo, Moyale and Jinka towns. It was also found that those individuals involved in exploration of gold in Adola (i.e. in southern Ethiopia) often stay away for a year or more.

Based on the research results, the timing for migration is not only determined by the farming activities at home but also the availability of work in the host area. In some cases people remained permanently to live in the new area, and ultimately relocate their families if they find the area to be more suitable for steady income. The majority, however, return home. In addition, more and more people are becoming mobile within the surrounding districts by engaging in small businesses.

Another topic that was discussed with individuals was whether or not involvement in PSNP and credit programs led to reduction in seasonal migration. In this regard, respondents had mixed views. One farmer said that "at the time of weeding almost there is nothing to eat at home. At such times, some people go to Moyale for daily labour work. Sometimes you do not get job or you may be sick with malaria then you borrow money from friends there for transportation and come back home. Since becoming a beneficiary of both PSNP and credit programs some are no more involved in seasonal migration". Other held the view that importance of credit and PSNP was yet to be revealed in terms of its influence on reducing seasonal out migration.

Those who said that there was a possibility that migration trend could decline reasoned out that the younger group who is benefiting both from PSNP and other food security programs (such as credit services) have been able to obtain farmland contracts with a longer period agreement for land in the low land areas. Often this is relatively better land and the individuals end up settling there. Due to improvements in transportation facilities, telephone services, the ability for free movement, and heightened security, however, more and more youth are involved in seasonal migration. These services have also improved the exchange of information regarding the availability of work; thereby increasing the frequency of migration and allowing farmers to do their farming activities in due time. In addition, it was found that the growing number of educated but unemployed youth have very limited access to land (e.g. land available for sharing from their parents) due to the existing high levels of land fragmentation. Many households are also economically poor and cannot help their children to be employed in small businesses. Phenomena such as these often force educated but unemployed youth to migrate away from their communities/households.

With regard to the impacts of migration on land management, the general opinions of the respondents were as follows:

- Terraces lack follow up and maintenance;
- Ploughing, sowing and weeding would be delayed;
- During heavy rains, the land might be exposed to over-flooding and high runoff without diversion;
- A decrease in tree growing and less care for the already naturally grown trees on farms (i.e. possibly resulting in a vulnerability to theft and/or damage to the trees by livestock)
- Less manure application

With a few exceptions, most respondents believed that those who stayed on their farms were better-off with respect to management of both their cropland and trees. In particular, households with labour constraints could not manage their land properly, and the occurrence of damage to trees by livestock, as well as the susceptibility to outside theft was high. The results have also indicated that, with the exception of a few, much of the income from seasonal migration was spent on household food consumption.

To conclude, payments for participation in labor-intensive public works of PSNP, as well as the credit service that recently started in the area, have helped farmers to be involved in various activities (e.g. livestock fattening, husbandry, small businesses, etc.). The loans have also enabled blacksmiths, weavers and potters - who have been relying entirely on these activities for income - to expand these activities. Blacksmithing, which was once left for a certain segment of the population, is now being practiced by other members of the communities. In addition, the loans have enabled an increasing proportion of women to get involved in the brewing of a local drink known as *cheka*, and landless farmers (or farmers with poor productive land) now have a greater ability to contract farmland within or outside Konso. In spite of all these positive impacts, farmers believe that seasonal migration in the study area is likely to continue in the future at an increasing rate because of the inadequacy of the program to reach all the needy.

5.4.3 Permanent migration and resettlement

The resettlement programs undertaken by successive governments of Ethiopia have typically shared similar objectives. These objectives have been centered around the improvement of the lives of rural people affected by drought and famine, through relocation of these individuals to areas where land and water are more abundant. Historically, the first government-planned resettlement program began in 1958 (i.e. at the time of Emperor Haile Selassie). Subsequently, the Derg government conducted its first resettlement program in 1975/76, its second in 1982, and its third during the period of 1984-1986. At the time, the government of Ethiopia claimed that the aim of the program would resolve the country's recurring drought problem, while also easing population pressure from the famine-stricken northern areas (i.e. where agricultural land had been degraded and over utilized). These massive resettlement programs were criticized as being forced settlement programs, often lacking adequate infrastructural facilities and not meeting the necessary medical and/or health care requirements of individuals. In addition, it was argued that the relocation programs were based on political motives with the intention of hampering the operations of armed struggle in the north.

In early 2003, the Ethiopian government (which is still the current government) launched a new resettlement program in order to achieve food security, with an objective of resettling 2.2 million people - approximately 440,000 households-from the chronically food-insecure highlands to the low populated lowlands (FSS, 2006). As such, resettlement can be viewed as one of the key components of the Government's National Food Security Program. In addition, it should be noted that prior to the implementation of this program, official statements claim that public meetings were organized in order to discuss the situation of their areas, relocation suitability, the accessibility and availability of resources within the receiving areas, as well as the overall potential advantages established through the enactment of resettlement programs.

Based on the research results from this inquiry, the Konso people have been positive towards the government's resettlement program-often volunteering for relocation-due to the magnitude and scale of the problems which have been occurring in the area in recent history. To elaborate, two rounds of resettlement programs have been carried out in Konso. In each program, the government stated that resettlement was a completely voluntary, and various

orientations were given prior to translocation. The two receiving resettlement areas were Selamago and Basketo *Woredas* in SNNPR.

During the first program in 2003/04, 7000 Konso households resettled in Selamago. During the second relocation program in 2004/05, 700 Konso households resettled in Basketo. For example, in Debena and Buso, 236 and 80 households resettled in Selamago and Basketo (respectively). Prior to relocation, discussion with the communities of the host area was conducted and their consent was secured. The priority to resettle was given to the landless, followed by those with small landholding and with land of poor productivity. Few farmers with big land-even if it was of poor productivity - were given the opportunity to resettle, while some landless could remain in their place because of individuals' choices. In rare cases, there were also some better offs that resettled merely as means to attain land for future use.

According to the government policies regarding the settlement program, the first year was for the preparation of land for cultivation and the construction of houses for the individuals. During this time the government fully provided food and other material assistance to the settlers. The programs were on a 3-year trial basis. During the first 8-12 months following resettlement, each settler was given assurances and support regarding the attainment of land, agricultural inputs, social services, development of infrastructural facilities, and food. During the second year of resettlement, assistance was given to individuals until the first harvest, then it was expected that the individuals would start producing agricultural crops. By the third year, the settlers had to live by their own means.

This 3-year trial period allowed any settler to go back to his former home at any time if he found that the area put his health at risk, or for a variety of other reasons. Based on discussion/interviews, most respondents indicated that this program had aided households in solving food insecurity problems, and had contributed to a reduction in productivity pressures on farm land at home. The farmers also indicated that migration and resettlement programs had contributed a lot in reducing population pressures. As such, if these two options had not been available, the current situation would have been very different and much worse.

These programs, however, have not been problem-free. The respondents have indicated that conflict between the new settlers and the host area

individuals had evolved, and had resulted in elevated concern by individual settlers that officials at the *Woreda* and Regional level need to react in time to avoid conflicts. This is showing signs of discouragement among farmers and created worries about resettlement program. Another question resulting from the relocation programs concerns the use of farmland in the areas where people are moving from. To elaborate, under the resettlement programs, if settlers return to their home within a three years period their land remains as their own. During these periods they can temporarily transfer their land with some agreed benefits to their close relatives or friends who are able to manage the crop land. As such, an interesting question to pursue here would be about what would happen with the land belonging to the farmers who have moved away from the area for more than three years or permanently settle?

5.5 Other strategies

5.5.1 Rationing

Households living in environmentally stressed areas are facing increased risks of impoverishment and survival due to persistent and recurring drought conditions. Farmers living in such circumstances adopt a number of coping strategies in order to manage risk. The specific coping strategies the farmers select are linked to their overall livelihood strategy. Coping with chronically low and variable yields of food crops is critical for the survival of farm households. In dry environments farmers always have to think about how to manage the risk (Mortimore, 2005). Farmers start rationing food consumption early in order to protect their productive assets; this action results in families living under stressed conditions (i.e. due to a reduction of the frequency of meals and/or serving-sizes). As Morduch (1995) observed, in an attempt to ensure year round food availability, households engage in consumption smoothing at far lower amounts than needed.

Typically, food consumption levels are already low in this area. Many households run out of food in about six months after harvest, and few are in a position to cover the year-round food requirements of a normal year. As such, when living under low/variable food crop conditions, households protect themselves by developing mechanisms against shocks and risks, and do so via step-by-step action. The most common first response by households and communities is to cut down on food consumption by

reducing the quantity of food, and/or by skipping meals (Table 13). When food is in short supply or too costly, the subsequent step of many households is to sell their assets - particularly their livestock–in order to raise cash for grain. During these times, however, livestock prices fall and the households do not receive the full economic benefits of livestock sale.

5.5.2 Borrowing

Another main response for a considerable proportion of households was a heavy reliance on borrowing grain and money in order to purchase food. Typically, the community in the affected area comes together to help each other in coping with the negative impact of drought. As all members of an affected community are not equally vulnerable to drought, at the community-level, relatives, neighbors and friends help each other by providing grains as a gift or in the form of a loan. A more specific example can be shown when considering the community institution called *Xelta* led by *Abatimpa*. This consists of a group of 5-6 members who assess the grain stores of all households in the village (or *Kenta*). After the assessment, the *Abatimpa* categorize the households in the village into three groups: (i) those with excess grain in their store, (ii) those with enough grain to feed their household, and (iii) those with not enough to feed their household. Those who have excess grain, which typically corresponds to less than 25% of the community, are required to lend grain to the latter household category. The household that borrows the grain is obliged to return it only during plentiful seasons. Any grain obtained from relief assistance for household incomes from other activities are not used to pay the debt. However, in times of continuous and severe drought it has become increasingly difficult for the better offs to provide such assistance.

5.5.3 Soliciting food aid

Another source of household food is through outside food aid. Food aid in Ethiopia, including the study area, takes on two basic forms. The first one is direct assistance (i.e. emergency distribution), and the second is through safety net programs which include food/cash for work (i.e. participation in public works such as the construction of roads or dams, and/or soil conservation activities). Food aid programs aim to enable households to fill the food gap, continue working on their farm land, and in particular, safety net programs are designed to protect and, if possible to build additional assets.

5.5.4 Shift to wild foods

Wild foods in Konso have been an important source of food and local coping strategies in times of severe food shortage. Such food sources remain important in the area today, particularly for those with little resource endowment. For instance, the results of the survey indicated that 73% of the population in Konso had been subsisting on these foods in famine periods. During the survey, the farmers identified about thirty different tree and shrub species whose leaves, roots and fruits as being traditionally used as food (See annex 7). Due to the decline in availability of these foods in their natural habitat, several farmers retained or cultivated some of these species and scattered on their crop land (i.e. in order to use them as emergency food, if necessary). Despite the high value given to biodiversity by local communities, open access to common forest resources and environmental changes have reduced the diversity and supply of such foods to vulnerable groups.

Many households were also involved in collecting fire and construction wood from the remaining few patches of forest or from their own farms as a strategy.

Table 13. *Household coping strategy (n =153)(%)*

Coping strategy	Strategy applied when situations are			
	Less severe	Moderate	Severe	Not applied
Reducing consumption in each meal	13.7	31.4	52.9	2
Skipping/reducing the number of meal each day	2	44.4	51.6	2
Eating famine period food or less preferred food	0	17.7	73.2	9.8
Borrow grain or money to buy food	0	14.4	81	4.6
Selling firewood	11.1	9.2	49.7	30.1
Selling construction wood	4.6	15	49	31.4
Rely on relief food	3.9	15.7	77.1	3.3
Migrate to nearby urban areas for wage labour	1.3	26.8	54.9	17
Migrate outside Konso	4.6	32.7	45.1	17.6
Selling small ruminants	1.3	22.2	64.1	12.4
Selling cattle	0	2	73.2	24.8
Selling house	0	0.7	58.8	40.5
Lease out land	0	0	56.9	43.1

5.6 The changing roles of trees and the need for enhancing their contributions

The Konso people identify two categorizes of land: *Konsita* and *Komyta*. The villages and agricultural lands are located in the middle altitude area are known as *Konsita*, whereas the lowlands - which are less suitable for settlement and agriculture - are known as *Komayta*. The *Komayta* consist mainly of lowland tree species. These lands typically serve as natural grazing lands and as a source for fuelwood and construction wood. *Komayta* is being converted to agricultural land due to rapid population growth, rising demand, and a limited supply of cropland and forest products. During the

survey, one key informant emphasized this point when stating the following: "40-50 years ago the area in and around Konso was covered with forest. The effect of rural population growth and increased pressure on the natural forest for farmland, construction, fuel wood, and other products depleted the resource with adverse effect on the environment and agricultural production. Most traditional rules and regulation which were able to manage and utilize resources, govern the economic and social life of the people, increasingly became incapable and powerless in implementing them".

The incorporation of trees as part of contemporary farming systems produces a number of advantages. According to Arnold & Dewees (1997), the first advantage is the maintenance and restoration of the physical environment which is needed to sustain agriculture (i.e. through the restoration of soil nutrients), while the second advantage is the role of various tree products in helping to sustain the rural household economy. Over many years Konso farmers have developed and applied various types of practices to conserve and enhance their farming systems.

Traditionally, most farmers have been integrating trees and shrubs with their food crops in order to benefit from their multiple uses. Konso's successful indigenous agroforestry practices, and its continued existence as a good landuse for years, are indications of the successfulness of indigenous conservation measures and signify the important role of trees in their livelihood systems. In the drylands of Ethiopia, the most common characteristic of the farming system (throughout the different rural landscapes) are selectively retaining naturally grown trees scattered over farmland. The most dominant form of agroforestry practice in the study area is displayed by the indigenous tree species that are found widely scattered on farmlands. Farmers were asked when and why the system was started; all replied that the system was inherited from their ancestors, and that they were still maintaining the traditional system in their current practices. Farmers said that the main reasons for initiating this practice–which was originally started by their great grandparents-could be that, as the forest resources became increasingly scarce, a specific tree-selection process was undertaken and trees which were considered to be more useful were maintained through natural regeneration. The degree to which agroforesty has been incorporated into agricultural strategies differed between different communities. Some *Kebele*s (such as Debena) claimed that the extent of tree cover on farmlands has gradually been increasing in their area; while other sites presently

characterize their area with a lower density of tree from what has been there many years before. In either case, most of the trees that exist on farm land are native tree species, and, through the careful management of selected seedlings, have been established on site via natural regeneration and/or transplantation of wildings. This preservation and careful management of the trees indicates their economic, environmental and social importance to the community; particularly with respect to the native tree species as only a few cases were observed with respect to the planting of exotic tree species (i.e. Eucalyptus and *Grevillea robusta*).

Unfortunately the abundance of native trees and shrubs has been disappearing from forest and farmlands. This is due to the conversion of forested land into farmland and to make way for crop production. Less abundance here means less availability and access to products and services offered by the trees. Based on the study results, there are apparent differences between *Kebele*s, depending on landholding, settlement pattern and the farming practice. For example, landholding in Debena is relatively better than Dera or Buso, but all follow a similar farming practice which is hand cultivation. As a result, of the type of farmland, tree coverage is higher in Debena whereas in Arfayde, Duro, or Gewada, landholding is much larger but the farming practice is based on ox plough and thereby does not permit the presence of trees on crop land.

The proximity of settlements to farms area is also a factor within agroforestry practices in the study area. For example, when considering the settlement locations in Debena, the villages are small, and are scattered over the area in close proximity to the farms. This ensures good protection from theft, and the trees are more adequately cared for. This is in contrast to the settlement patterns of Dera, Buso or Mecheke, where the villages are very big, few and concentrated over a small area; thereby resulting in farmlands being located far from these villages. This settlement pattern could make farmers less interested in retaining or growing trees. As shown by these examples, when initiating private tree growing, any tree growing strategy also has to consider these differences in order to identify appropriate niches.

When considering the results of this research inquiry, the presence and number of trees appeared to vary according to wealth status, number of plots and soil fertility conditions. However, tree growing may also be in conflict with the farming systems due to its land, nutrient and moisture

requirements. These requirements are not only an issue with respect to the crops of the owner of the trees, but also with the crops located in adjacent farms. This competition for resources can potentially create social conflicts between farmers. In general, such cases are not common, however if this situation does occur, informal institutions must get involved in order to settle the dispute. If it is concluded by these individuals that the presence of trees is negatively affecting the adjacent farm, they typically decide to reduce the number of trees.

In the study area, certain trees also hold cultural and traditional significance. For example, the cultural and traditional institutions of Konso advise the community to retain big and native trees on the grounds of cultural heritage. These trees are used in the construction of cultural community houses known as M*ora*; a place for gathering and recreation, and where all young unmarried men of villages stay the night in order to provide services for the community such as fire outbreak or taking sick people to health centers.

5.6.1 Farm tree resources and species preference

The natural resources continue to degrade as a result of increased dependence and unsustainable use of forest and other natural resources. In response to the decline in the availability of forest resources, the Government has promoted tree growing through community forestry since the 1970s. Tree growing on individual farm plots in the form of agroforestry, and co-management of common property resources - such as natural forests and/or woodland areas-are also other options.

Many respondents believe that there has been a severe loss of trees and an overall reduction in area coverage and species composition. As mentioned, in order to overcome such a problem, farmers have been adopting traditional agroforestry practices for decades. In this study it was found that the intensity of agroforestry practice including the type and number of trees varies from one *Kebele* to another, as well as within the same *Kebele*. Based on the statements of made by farmers, it appears that the most important factor for the number and species of trees found on agricultural land is the quality of land, access to the remaining patches of forest, and land size. The farmers' preference of tree species grown on farm land is shown in (Table 14).

Table 14. *Ranking of farmers' tree species preference*

Species	Terminelia brownia (Oybeta)		Juniperus excelsa (Birbirta)		Acacia sp (Sebenta)		Cordia abyssinica (Otayda)		Acacia sp (Kolelta)		Moringa stellopetala (Shlekta)	
Criteria	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Fuelwood	7	9	7	6	7	4	4	2	7	6	2	1
Fodder	10	10	1	0	5	6	8	7	3	4	5	2
Soil amelioration	7	6	1	1	6	6	4	4	5	6	4	5
House construction	9	9	10	10	7	6	3	5	8	8	1	1
Cash income	7	6	9	8	6	5	8	6	5	6	5	7
Drought resistance	5	5	7	7	8	9	5	4	9	9	5	6
Quick return	4	4	3	1	2	2	2	2	1	2	8	7
Total score	49	49	38	33	41	38	34	30	38	41	30	29
Rank	1	1	3	5	2	3	4	6	3	2	6	7

One remarkable observation in the farming system of Konso was the integration of trees with crop production. There is a stronger tradition of tree growing in Konso in particular. Farmers have been practicing traditional agroforestry for many centuries, and have had a long history of retaining or introducing trees on their farms. Dispersed native tree species on farmlands characterize a large part of the study area landscape. The trees are very important components of the farming system. Trees in Konso are mainly managed for subsistence use, and to a lesser extent as an additional means of income. The presence of many tree and shrubs species–with a wide variety of different uses-contributes to the diversification of tree products. They provide local construction, livestock fodder, food, fuelwood and they also play beneficial ecological roles and services.

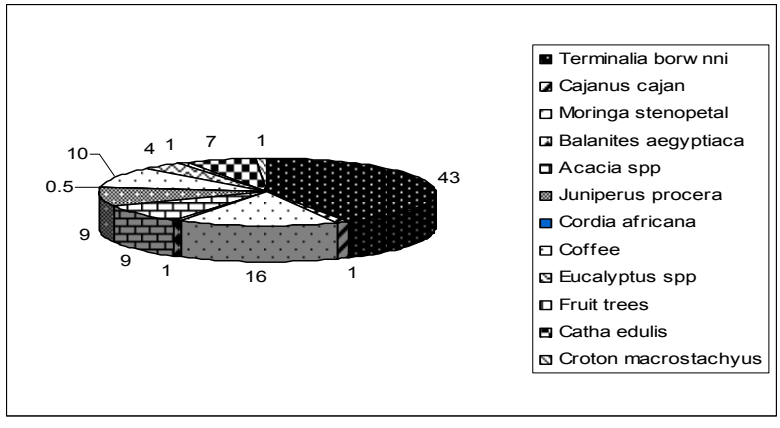


Figure 13. Tree species composition on farm plots

In this study, about 12 tree species were recorded during the field survey. These trees were the most commonly used species by farmers. Some trees were common on the farms, while others were rarer. Although the frequency of occurrence varied from *Kebele* to *Kebele*, in general the *Terminalia borwnni*, *Moringa stenopetala*, and Acacia species were the most frequently observed tree species on most farms, due to the wide socio-economic importance attached to them. A high diversity of tree species was observed at the Debena site. The results of the area-wide field survey indicated that almost all tree species were indigenous trees, except eucalyptus which accounted for only 4% of the total tree population. The majority of farmers (97%) retained naturally regenerated trees grown on (or around)

their farmlands. Most farmers (61%) own between 1-20 trees, while only 4% of the farmers owned more than 100 trees.

The data for determining the species composition was obtained by counting trees on the plots. As displayed in Figure 13, in terms of the tree species composition on all surveyed farm plots, the most protected and intensively managed types included: *Terminalia borwnni* (43%), *Moringa stenopetal* (16%), Acaccia spp (9%), and *Juniperus procera* (9%). In this survey, *Moringa stenopetal* the traditional cabbage tree which is famous in Konso and the surrounding area, appeared to be lower in proportion. The reason is that moringa trees that are found around homesteads and villages were not included in this survey.

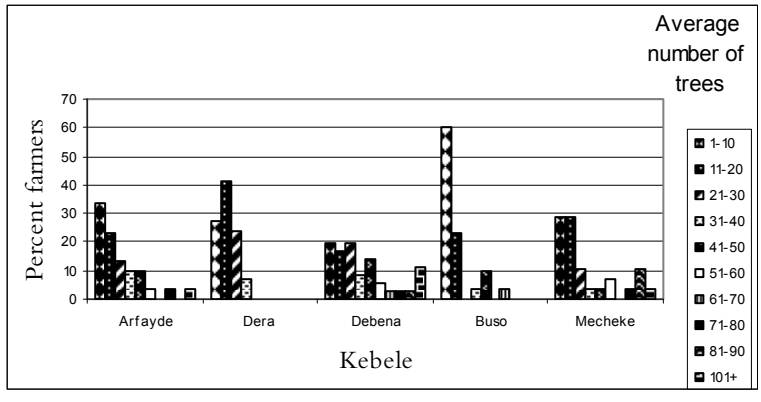


Figure 14. Percentage of farmers owning average number of trees for each study site

Just as the diversity of tree species varied across the different Kebles, so did the density of tree species. The highest total number of trees recorded per *Kebele* varied from over 400 trees in Debena to 40 trees in Dera. The mean number of trees from all plots ranged from 14 at the lowest, to 50 at the highest, in Debena and Buso respectively. In general, the results also showed that Debena and Mecheke showed the most significant difference in terms of density of trees (Figure 14).

Based on the results presented, there were 531 plots owned by respondents; of which 427 plots (80%) had trees. These results translated to an average of 11 trees per plot.

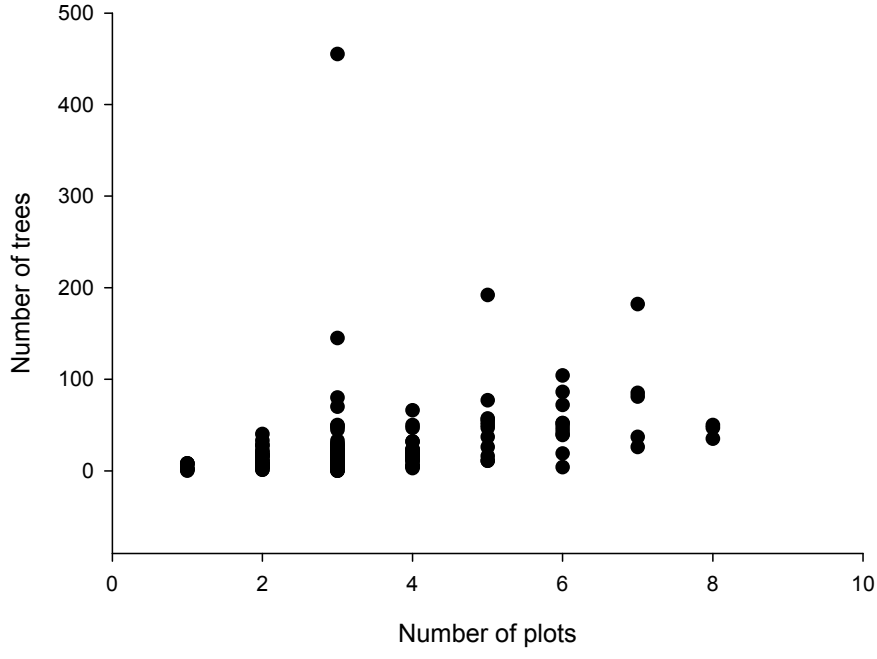


Figure 15. Relation between mean number of trees and number of plots

Since the farmers had indicated that more trees are prevalent on plots with poor soil fertility, the survey data was also used to analyze the relationship between the soil fertility status of the plots and the corresponding density of trees. The results showed, however, that there was no correlation between the two variables. Instead a correlation (i.e. $r = 0.31$, $P < 0.01$) has been found between the density of trees and the number of plots. Furthermore, the results have shown a negative correlation ($r = 0.21$, $P < 0.05$) significance level between the distance of plots and the number of trees (i.e. as the distance–or, travel time, in minutes - increases the number of trees on the plot declined) *(*Figure 15). These results suggest that farmers prefer growing and managing trees on plots that are closer to their villages, so that they can easily monitor and look after them.

5.6.2 Strategies and objectives of tree growing

This section characterizes the following: (i) species composition, (ii) factors determining the density of trees, (iii) management strategies for intended tree use, and (iv) future tree expansion in the study area. It also describes the various uses and relative importance of trees on farmland to rural people. The intention here is that, by developing a better understanding of these items, it will facilitate a heightened focus on priority species for improved management and conservation. In addition to the present environmental benefits and fulfill subsistence use of trees, an attempt has been made to examine potentials for farmers to use trees as a means of income generation.

Through a questionnaire, farmers were asked to rank the five most important uses of trees in order of importance. The results of the questionnaire were supplemented by qualitative findings. The different uses of tree products and species preferences of men and women were also assessed. Based on the results of the questionnaire, the most important uses of trees identified by male headed households were: construction (69%), cattle feed (35%), human food (12%), fuelwood (24%) and cash income (18%). Women choice in male headed household as might be expected uses of trees for fuelwood accounted for 65 % followed by cattle feed and human food 38% and 35% respectively (Table 15).

Table 15. *Ranking of uses of tree by men and women in a male-headed household (%)*

Uses by importance	Construction wood		Cattle feed		Human food		Cash income		Fire wood		Agri. Eqpnt.	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
1st	69	12	7	11	1	9	3	3	0	65	0	0
2nd	7	5	35	39	12	31	18	5	3	18	1	0
3rd	1	14	29	38	11	35	16	5	15	5	1	0
4th	1	8	1	5	10	9	11	11	24	5	3	0
5th	0	1	1	1	3	4	3	5	4	0	0	0
1st	69	12	7	11	1	9	3	3	0	65	0	0

The uses of trees by women who are household heads were different from the choices of women in male-headed households. As shown in Table 16, just as men typically wanted wood for construction, female headed households used and needed trees primarily for the same purpose. The second and the third most important uses for trees within this category was

fuelwood followed by cattle feed and human food. For male and female headed households, important of trees as cattle feed was more or less to the same level. It is also to note that cash income was not a leading use of trees in the study area, thereby indicating the heavy subsistence use of trees by households.

Table 16. *Uses of trees in female-headed household*

Uses by importance	Construction	Cattle feed	Human food	Cash income	Fire wood	Agri. Eqpnt
1st	48	9	15	9	9	0
2nd	15	18	15	18	30	0
3rd	3	42	30	9	9	0
4th	6	9	9	21	21	0
5th	3	3	3	6	0	0

According to the men, the products of trees that were presently in short supply were: construction wood, cash income, fodder for livestock, food products either for consumption or sale (e.g. moringa leaves and coffee beans). Women, on the other hand, felt that fuelwood has been in short supply followed by human food and livestock fodder.

Trees are seen as playing different roles in the different farming systems. The growth of preferred tree species based on the farmers' preferences, species diversity, and their intended purpose were all important aspects of the study; both with respect to their benefits towards enhancing farmer livelihoods, as well as for preserving the environment. The primary roles of trees on farms have been mostly for household uses and to serve as buffers in times of hardship. Respondents were asked whether or not they felt it was important to grow trees related to uses and the location of growing. Based on their responses, about 87% of the farmers in the study area were very interested in the future expansion of trees. With respect to developing a rationale as to why it was important to grow trees, respondents gave different answers and objectives varied according to the gender of the respondent.

The most important reasons given by male respondents for growing trees were construction, cattle feed, human food and means of income generation. Firewood was the priority use for trees outlined by the women. Livestock

feed and human food were the most important reasons given by both men and women for growing trees.

With regards to the decision making authority on what and where to grow, and how these trees are managed and used, it is often the head of the household who makes the decisions. Only 6% of the male headed households fully involved women in such decision making processes. The majority of female headed households (70%) made decisions by themselves, while a relatively low proportion of men in female headed households made these decisions (21%). It was also found that the involvement of any of the mature household members in the processes of decision making was quite insignificant.

There was also gender difference regarding species preference, intended products, and the location for growing the trees. For example, men respondents chose *Terminalia brownie (33%), Juniperus procera* (20%) and eucalyptus (17%) as their most preferred species; while female respondents indicated *Moringa stenopetala* (49%), *Terminalia brownie* (26%) and eucalyptus (2%) as their choices of tree species. This observation clearly showed contrasting interest with respect to gendered preference of tree species and is presented in (Table 17).

Table 17. *Respondents first preferred choice of tree species*

Preferred tree species	Male	Female
	%	%
Eucalyptus	17	2
Terminalia brownie	33	26
Juniperus procera	20	4
Cordia africana	2	1
Moringa stenopetala	2	49

With regard to the intended purpose of tree growing, men reported fodder, firewood and construction wood for own use, (31%), and (lumber, poles, beams and rafter for selling (37%). On the other hand women reported human food in the form of edible leaves (49%) firewood and construction wood for selling (3%) as their preferred products from trees. With respect to growing location, all respondents preferred to grow trees around or within farmland; with more interest by women regarding the growth around homesteads.

One of the factors affecting farmers' tree growing and management activities was the availability and access to quality growing stock of preferred species. However, the farmers also stated that their preferences for tree species selection were based on the trees' amenability with associated crops; the species' ability to produce multiple products of desire; the species' perceived economic uses; the species' growth rate; and the species' environmental compatibility.

During the survey, farmers were asked about the sources of tree seedlings. The results indicated that 76% of them obtained tree seedlings that have been naturally regenerated (either on their farmland or another individual's farmland). The second two important sources of tree seedling were government nurseries, followed by private home nurseries and/or NGOs. Wildings transplanted from the surrounding forest are also other sources of seedlings. In general, it is important to note that farmers underscored that a lack of tree seedling was a problem, and that the major constraint that limited tree growing was associated with preferences towards particular tree species. Also, based on the findings, the farmers relied on certain locally available tree species. And, as such, any tree production strategy should focus on farmers' needs and preferences given their specific conditions and changing circumstances.

Most of the constraints mentioned by farmers in this study are commonly known and similar to those reported elsewhere in Ethiopia. The major constraint-indicated by 90% of the respondents-was a shortage of land. The other constraint identified was a poor survival rate of seedlings due to a shortage of rain (i.e. drought). As mentioned above, the third most important problem hindering tree growth in the study area was a lack of seedlings. Despite the remoteness of the area, the farmers indicated that market is not a constraint in the area. In particular, a strong market was apparent within the town of Karat with respect to construction wood and lumber, while fruit, particularly mango, was seen to have a big demand in neighboring districts (e.g. Moyale). The farmers emphasized that marketing opportunities existed for them to transform their traditional and subsistence use of trees towards in line with these (and other) market orientations. It was also discovered that labour shortages, lack of skill, damage by livestock and tenure insecurity were less critical constraints.

It would be unwise to establish wide generalizations at this stage of study and to form analyses that focus simply on the subsistence use of trees. Rather, there are several economical and institutional issues that need to be addressed in order to promote trees as a source of income. The income generation idea of trees in supporting livelihoods is appealing; however, the opportunities and constraints required to improve livelihoods by tree cultivation (and/or for trees to serve as an income generation alternative for the farmers) need to be critically assessed and examined from both a socio-economic and environmental perspective. Enabling policies are also needed to strengthen the role of trees in food security, poverty reduction and economic development in the long term.

5.6.3 Challenges and opportunities for tree farming

It has often been cited that well-defined property rights for land create incentives for farmers to use land more efficiently and to invest in the enhancement of land fertility. This approach, however, requires long-term leases or secure land titles in order for individuals to benefit from their long-term investments. It should also be considered that farmers will likely not grow trees if there are uncertainties as to whether or not they will continue to have rights of access to their holdings.

Unlike many places in Ethiopia, the current land tenure system in Konso has no influence on tree planting. Farmers can grow trees around their farms or homes and cut trees whenever they deem it to be necessary or beneficial. During the study, the farmers also stated that even farmland that had been acquired through contract agreement or temporary free use could be grown with trees, and the trees could be subsequently used once they had reached maturity. The farmers indicated that if the contract period was terminated, or the land that had been freely given to the individual had to be returned to the owner, the trees that were grown could be harvested by the grower, or the grower would receive some form of compensation for the trees. Also, during the interviews, key informants confirmed that up to that time, the current land tenure system in Konso had not been a constraint on investments in crop land improvement and tree growing. However, land registration and certification, which are a part of a continuing process of change brought about by policies to increase tenure security, are now being seen as a way of taking land from farmers via land redistribution. However, while the recent land certification program has increasingly become a cause

for concern, in reality, the rumor of land redistribution has been there since the period of the Derg.

Building on the above, farmers in the area have been developing a heightened feeling of insecurity associated with the potential enactment of land certification policies. While the implementation of a certification program has not yet been initiated, orientation and training has been given to the communities and *Kebele* Administration. And, in contrast to the assurances of stronger land use right that are being outlined in land certification policy, the farmers fear possible land appropriation due to potential land redistributions. Based on the interviews, some farmers did not trust the government, and, as a result, some are thinking of abandoning - or have already abandoned - terrace maintenance processes and/or tree growing on land which they think might be appropriated (i.e. on 'extra' land or a less productive plot). Rather, they are showing preference towards allocating heightened attention to land which they consider to have high crop productivity and/or use. This approach has now become a cause for land misuse.

In addition to the various development interventions of PSNP pointed out above, respondents explained that the allocation of land for trees and crops was based on three interrelated factors. The first factor was that farmers with bigger land were able to grow or retain trees on their land in scattered, widely spaced manner, so as to reduce competition between the crops and trees; regardless of whether or not the plot's soil fertility was good. The second factor was associated with small holdings where farmers allocated their entire plot solely for the purpose of growing crops (i.e. regardless of soil fertility). The third factor was that hilly and steep area – which was marginal for crop cultivation and highly exposed to flooding - could be used for the growth and cultivation of trees. However, there are also situations where such kind of land could be put under agriculture for lack of land. More generally, trees that were located far from villages and resident areas received less attention in terms of weeding and application of cow dung. For example, one could observe a plot with many trees on the land to be either poor in its soil fertility, or, if grown with *Cajanus cajan* in the form of tree fallow, as being set aside for soil fertility restoration and later farming. Typically, approaches such as these are practiced by farmers who own big land, and has simultaneously enabled farmers to grow other tree seedling.

Considering the above, land size, fertility conditions, the location of farmland, and the perception of people towards trees, are important considerations for different landuse practices. During the interviews, farmers also outlined a relationship between wealth status and tree growing. Based on these results it can be inferred that, typically, the better off are the ones with large land and fertile soils. On these lands, most trees are inherited and retained by the present owners, with some level of new plantings. If they are faced with cash shortages, often they do not cut trees to fulfill their cash need; rather, they sell livestock (e.g. goats or sheep). The poorer individuals, on the other hand, often have no trees, and if they do have a few stands of trees it is more likely that they will cut trees to generate income as they have no other assets to dispose of.

Based on the research findings, the initiative and motivation of the farmers with respect to tree growing and protection is not only due to the current food security programs, but is also based on an increasing purchasing cost for wood (i.e. for house construction), as well as other economic benefits that the local community can obtain from trees. For example, a wood that used to cost Birr 4 a few years before now costs Birr 15-20. This elevated cost has had a positive influence on households' decisions to grow trees. One farmer said that "unless we grow a tree that is most suitable and adaptable to the climatic and soil conditions of the locality as well as economically beneficial, wood availability will remain to be serious constraint".

Regarding the situation of landholding, one of the key informants stated that: "on average people own about half hectare of crop land of several plots. These plots have been fragmented due to inheritance of land to children. Now the people have reached the point that several members of the family could not be able to inherit land. The father now could inherit him only an axe to cut trees in order to open up new agricultural land". However, the Konso lowlands are inhospitable and all suitable croplands are already occupied. The key informant also indicated that households in the area may not be willing to grow and incorporate more trees on land suitable for crop production, as it had been before in the form of traditional agroforestry system. This is due to fear of competition with trees and shortage of crop land. However, farmers could be positive toward tree growing on land not suitable for agriculture such as around farms, and homesteads/villages, on very poor crop land, along river courses, etc.

The key informant also observed a contradiction within the food security programs. For example, in the government credit program, it is the poor that get the loans needed to start businesses such as goat/sheep husbandry, or ox fattening; however, the major constraint being faced by these farmers is having a suitable source of fodder. Often these poor people own no source of fodder, or have small land and do not own sufficient quantities of fodder for their livestock fattening program. To further complicate the matter, theft of fodder is on the rise in *Kebele*s around the town of Karat. This action translates not only to unexpected loss of fodder with no benefits gained to the tree owner, but also the untimely cutting of branches; thereby causing long-term damage towards the sprouting ability of trees (i.e. for new leaves and shoots), and eventually causing a reduced production of fodder. The situation is so critical that even the penalty that has been raised from Birr 5 to Birr 70, has not been able to completely guard the tree owners against theft.

5.6.4 How to enhance the role of trees for poverty alleviation and conservation?

Farmers are growing eucalyptus, Juniper and Grevillea. Small quantities of fruits are becoming available in the local market from trees (e.g. mango, guava and others). There is a big and growing demand from farmers for eucalyptus. However, due to the perception on the potential negative environmental and ecological impacts, and also considering the prevailing environmental conditions of Konso, experts limit the planting of Eucalyptus. Instead, Grevillea has been found to be a promising tree as it performs better in Konso's conditions than eucalyptus. As such, farmers have been showing interest in growing the tree. Fruit trees-specifically mango trees-are expanding, and it is expected that within the next five years or so farmers will start benefiting from the trees. The current demand for mango is huge, but there is a critical shortage of available seedlings. Tree seedlings of native tree species such as Moringa and Terminalia, which naturally regenerate on farmlands, tended and managed by farmers are no more produced in the nursery and more attention is given to other species which are not easily accessible to farmers.

Based on the interviews, the respondents perceived that, due to an expansion of construction, the demand for wood was growing and there was a big potential for construction wood within Konso and the surrounding districts (specifically with respect to wood products from Juniper and

Eucalyptus). In particular, lumber products from Juniper and Cordia – used for furniture making - had ample market in Yavelo, Arba Minch and the town of Jinka in southern Ethiopia. The respondents also indicated that fruits like avocado, mango, papaya and banana were very expensive. There were, however, markets for these products in the growing town of Karat and Yavelo. The demand for construction, fodder and utensils were also increasing at household level within the rural communities of Konso. Some respondents even said that there was no need to search for markets; particularly with respect to construction wood and fruit. There was also a big demand for a stimulating leaf called Khat (*Catha edulis*) in Arba Minch.

The potential market for fruit and other tree products needs to be seen from a point of view which considers the development of urban areas and the expansion of roads that facilitate access to markets in other areas. In this regard, the town of Konso is small but is growing, and the demand for fruit and construction wood is on the rise. The rehabilitation and construction of new and existing roads to Jinka, Yabelo, Moyale and Yerga Chefe create potential markets for tree products in areas outside Konso.

Many people in Konso have already been involved in selling mango fruits to Yabelo and Moyale that are grown outside Konso such as Arba Minch. As Konso is closer to these areas, there is a possibility to take over this business from Arba Minch. Other products-such as construction wood from Junipers, Cordia and eucalyptus-are highly marketable products everywhere. Growing trees requires patience, as it takes several years for the trees to reach maturity. For example, growing mango or eucalyptus may take up to seven years to get the first harvest, while growing Junipers may take over thirty years. As such, mixing different tree species that yield early benefits with those that require long-term return could be a good strategy to attract farmers.

Farmers grow Eucalyptus and native tree species with high value such as Juniper and Cordia for construction, furniture and poles for market, as well as a range of household uses. The forest technicians in the area also agree with farmers' preference to fruit trees. For example, cross-bred and grafted mango fruit trees have been tested in the area, and the farmers showed great interest; however, the price of each seedling was expensive and farmers could not buy them. The technicians believe that instead of putting all the efforts solely on communal lands, some resources should be allocated from safety net for such kind of activities as they believe they are useful in

household asset building; in enhancing the outcomes of PSNP; and in the elevating the contribution of trees towards poverty alleviation. They also confirmed the availability of market for construction wood and fruits.

Trees grown on-farm can make substantial contributions to problems of low agricultural productivity. The rapidly growing demand for construction and other tree products could offer a potential market which stimulates tree growing as a commodity in smallholder farming. However, more research and understanding needs to conducted and developed in order to help clarify how farmers can take the advantage of this situation in order to transform their livelihoods.

The factors affecting individual households' decision to grow trees growing are highly interrelated. These factors include components such as: low food crop production (which is often not enough to meet household needs), competition for landuse options, investment opportunities, and available labour. In addition, when taking a rural poor perspective, trees require a longer gestation period. As such, on a short-term basis, tree growing may not be an attractive livelihood option. Low income levels tend to force people to focus more heavily on strategies that offer quick returns, thereby making forestry less competent in improving rural livelihoods and lowering its potential role in poverty reduction. In addition, low economic returns for tree products offer limited economic opportunities for the rural community. Inadequate access to markets, or poorly functioning markets and information among rural farmers, further constrain the option and discourage the investment in trees. Poor physical and institutional infrastructure (e.g. transportation systems, credit facilities, etc.) also constrain the essential services needed by the farmers to practically consider tree growing as a livelihood option. Therefore identifying enabling conditions, related to market opportunities calls for possible policy support option as a necessity to achieve increased income from tree growing.

5.6.5 Technological and institutional measures to promote tree farming

Trees grown in the different niches of the rural landscape diversify and sustain production and lead to increased social, economic and environmental benefits for land users at all levels through improved profitability, reduced risks and diversified sources of income to buffer against crop failure (Leakey *et al.*, 2005). Farmers in Konso grow trees on their farms, and the majority

of the farmers are interested in tree growing, particularly with respect to commercialization.

The consensus from the discussion showed that major factors that determine the growth trees include: shortage of land, low income, competition with agricultural crops, lack of preferred tree seedlings, and adverse environmental factors limiting survival and growth of trees. The community has been cultivating and managing naturally regenerated native trees on farm lands. The community lacks experience of fruit tree growing and management but slowly getting experience from the neighboring areas. In addition to the biophysical factors and available resources, the success of a tree growth operation will also be determined by policies that support tree growing by the private sector, with regards to aspects such as: clear and secure land and tree rights, access to infrastructure, viability of local markets for commoditization of tree products to enhance rural income, free movement of tree products, etc. Other factors include availability and dependence of rural communities on forest products from natural forests, agriculture and livestock management practices, attitudinal factors, socio-cultural/ institutional perspectives and gender.

Recognition of the environmental and economic benefits of trees has often been focused on agriculturally favored areas. In spite of the considerable area covered by the drylands, the promotion of tree growing as a commodity in agriculturally marginal areas has been given inadequate attention. This has occurred for various reasons. In this regard, the creation of an enabling environment is a necessary condition if trees are to provide their economic and ecological benefits. The Konso communities see construction wood and fruit as potential opportunities for new and/expanding markets. However, farmers often find it difficult to take full benefit from both the local and regional markets due to inadequate policy options which favor marginal and remote areas, such as inadequate knowledge of market, limited access to information and networking. In addition, a lack of transportation-and market stability itself-is of a particular concern when it comes to fruit production.

Considering the above discussion, the contemporary, fast changing socio-economic and environmental circumstances, competing interests, and demands of land users and various aspects of policies and practices at local, and national level, are all contributing to the challenges towards

incorporation of tree growing strategies at household level. Moreover, trying to determine how these changes can be incorporated and implemented through appropriate, context-specific polices in order to maintain enhanced livelihoods becomes an even more complex issue.

6 External interventions and their impacts

6.1 Interventions and impacts

When considering food aid over the past decade, there has been a shift in thinking from relief aid to development and from food to livelihoods. There has also been an increased focus on the link between relief and development as a sustainable solution to helping households that are chronically food insecure. The Ethiopian government has been combining comprehensive and multisectoral efforts in order to help ensure that vulnerable groups become food self-sufficient in the short-term, and food secure in the long-term. For example, in its commitment to move away from emergency appeal, the Government of Ethiopia launched PSNP in 2005. PSNP is a part of the government's food security program that has been designed and enacted with the purpose of making aid more developmental and sustainable, and to help establish a much needed food security strategy for the chronically food insecure *Woredas* in the country. PSNP is one of the components of the Konso *Woreda* food security program. Most of the natural resource rehabilitation activities and other public asset development intervention programs in the study area are often implemented through PSNP.

The organizational structure within PSNP includes three committees accountable to the *Woreda* Council/ Cabinet. These include: the *Woreda* Food Security Task Force (the highest decision making body, with responsibility for the allocation of safety net resources to beneficiary *Kebeles*), the *Kebele* Food Security Task Force, and the Community level Food Security Task Force. Among the major activities of the *Woreda* Food

Security Task Force, several of their key responsibilities include: the review and approval of activities planned by *Kebeles*, the approval of the number of beneficiaries in public work and direct support, safety net resources allocation and utilization, and monitoring and evaluation of the program. The *Kebele* Food Security Task Force is mainly involved in activities such as: the identification of needs in households and the community, the prioritization of activities through the involvement of the communities in the planning process, the screening and approval of eligible beneficiaries (both for public work and direct support), and the selection of a site for implementation of activities. The Community level Food Security Task Force is mainly responsible for identification of beneficiaries and for submitting lists of the potential participants to the Kebele Food Security Task Force. The Kebele Food Security Task Force also consists of a subcommittee that hears appeals related to safety net activities and, often, payment and beneficiaries selection issues.

The program aims at preventing asset depletion at the household level by encouraging households to engage in productive investment. In order to address the root causes of food insecurity, the program also aids in facilitating the creation of productive community assets. The program consists of two components: public work and direct support. The public works activities are predominantly implemented on communal lands, and are mainly done so with the aim of creating public asset through the protection, conservation and/or development of natural resources and other public assets. Activities on private land can be undertaken provided that they are critical. Such activities must be included and approved by the community in the planning process of the watershed plan. Households who have no labour at all, no other means of support and who are chronically food insecure and those affected by HIV/AIDS receive direct support.

The World Bank Food Security program is also one of the food security packages that supports and contributes to the country's food security strategy. The World Bank Food Security Program belongs to the organizational structure of the *Woreda* Food Security Task Force, where the *Woreda* Council/ Cabinet are the owner of the project.

The World Bank Food Security project provides loans; mainly in a revolving fund mechanism which is provided as a start-up working capital for agricultural and non-agricultural activities. By providing increased

opportunities and flexibility, the program aims to enable households with respect to their involvement in income generating activities. This approach aids in building their household asset base, while also contributing to the development of the local economy.

6.1.1 Impacts of PSNP and access to credits in diversifying and improving livelihoods

Over the past three decades, various government and non-government organizations have been working in Konso to help people improve their livelihoods. During the focus group discussion and workshop undertaken in this study, experts and farmers listed some of the major interventions, impacts and indicators.

- Health posts
- Water resource development (such as micro ponds, spring development, deep well construction, construction of public ponds to provide potable water for humans and animals)
- Home nurseries for tree seedlings
- Expansion and upgrading of schools and construction of alternative basic education centers
- Road construction
- Soil and water conservation activities
- Loan and credit services from private micro finance services and the World Bank food security project
- Tree growing on private and communal land

Positive indicators of the impacts of the interventions that were indicated by participants included: the distance of travel to visit health centers was reduced, awareness regarding child care and growth promotion had improved, awareness of disease prevention and vaccination are also has come close to villages, reduced time spent on fetching water and awareness about family planning increased. Based on the research results, the impact of population pressure on the household seems well understood, and family planning is slowly gaining acceptance (i.e. a few women had started using birth control methods).

Education, which was at a very poor level a few years before, has been improving; however, much effort and hard work is needed to reach many children in need of education. Today, informal education schools are being

expanded besides the formal education, as it has been observed that the informal education strategies are more suitable than formal education for many children within Konso. Other indicators such as an improvement in reading and writing skills were noted in almost all of the Kebeles as alternative basic education centers have provided an opportunity for those who have no schools close to their village – as well as late-starting children - to partake in study. The farmers in the study believed that education provided job opportunities for their children and they considered it as one means of reducing pressure on farmland and further land fragmentation. Others, however, considered education as a disincentive as it was perceived that it took away household labour from farming activities.

Considering that the credit schemes started recently, it is too early to draw conclusions on their impacts. The farmers outlined a few promising examples where credit provision (through the food security project) had enabled some beneficiaries to keep their own cattle and work on their own land, while also developing skills of trade required to generate cash income. However, overall, access to credit was low. Most participants noted the improvement such as on health, water and education.

A local NGO - known as Parka - has been working on strengthening local culture and environmental protection to help people improve livelihoods. With regard to interventions that have had no impact on peoples' livelihoods, the experts shy away from mentioning/discussing them. However, several farmers indicated that micro ponds - which were constructed with a high input of labour, material and food aid - failed in many areas of Konso, and most farmers were not using them. The farmers also complained about the location of the ponds in terms of their suitability to collect water, safety issues (particularly with respect to their children), and several technical problems that were observed during their construction. On the other hand, some farmers indicated that the use of micro ponds differed from one *Kebele* to the other and from farmer-to-farmer. As such, few examples existed where the introduction of micro ponds enabled the farmers to generate additional income (e.g. by producing vegetables). The farmers also suggested that the different interventions implemented in the safety net program are poor in their quality; particularly with respect to soil conservation strategies that are not as long-lasting as traditional methods. In addition, the payment for safety net programs was low when compared with payments received for the same amount of work in other projects.

The major activities undertaken as public works included projects which focused on issues such as: soil and water conservation, water harvesting, reforestation and hillside closures, and rural infrastructure development (such as roads maintenance for schools, construction of clinics, toilet construction etc.). The impacts regarding the tree growing situation were better than it had been 4-5 years before. The purchase of relevant equipment and material for nurseries enabled tree seedling production to increase from three hundred thousand to two million seedlings per year. Most of the tree growing has been carried out on communal lands. For example, in Debena about fifty hectares of trees have been planted, however, due to drought, often the survival rate is low (i.e. as repeated replanting has been done year after year on the same site). Participants also indicated that the awareness towards environmental concern was rising. As a result, highly degraded areas were closed from any influence of humans and livestock and are being rehabilitated. Even some minor benefits are being generated. Farmers also singled out the problem of getting preferred tree seedlings from NGOs and government nurseries.

Several examples of individuals who are eligible for direct support include: households who do not have labour to participate in public work, households without sufficient and reliable support, and/or those disabled people. The program is also gender sensitive. Pregnant women are entitled for the support starting from the fourth month pregnancy until birth, and lactating mothers for the first ten months after birth. Considering the impact of HIV/AIDS on household food security, the direct support system also gives attention to individuals with the virus. The idea here is that those who are aware that they have contracted the virus and are participating in the public works of the safety net program could be transferred to direct support - provided they have revealed their HIV status. Under these conditions the aim is for the individual to serve as an example, and to thereby heighten education in the community about HIV/AIDS. Culturally, the issue of HIV/AIDS is still a sensitive matter; even in the urban areas, let alone in the rural communities.

A considerable proportion of the beneficiaries of the program in the study area have been using the transfers to meet immediate household consumption needs, mainly for the purchase of food grains. Few beneficiaries invested or saved some from their earnings. It has been clearly stated in the PSNP document that unless other food security programs are

integrated, PSNP merely would be used for direct consumption purposes and protection of assets, with little investment in agriculture or other productive activities. As such, the implementation of complementary food-security projects (i.e. in addition to PSNP interventions) would be of great help and importance in speeding up household livelihood asset development and recovery from their current situations.

The World Bank Food Security Program started recently in 2006/07. Based on the research findings, one of the key informants believes that the beneficiaries understand the objectives of the program. At the beginning, the communities do not know the amount of money allocated for each *Kebele* (which is about USD 18 000 or Birr 162 000). Today, they know that their *Kebele* owns this money and that they are eligible for loans and able to implement income generation activities provided that they have submitted their own business projects. Also Birr 21650 is allocated for community wide projects such as health. However, there are big differences in the number of beneficiaries between *Kebele*s, and there are *Kebeles* not included in the program at all due to a shortage of manpower and poor orientation within the program. The project covers ten *Kebele*s, and recently an additional five *Kebeles* were included. Also, training of beneficiaries, which should be given at the initial stage of the program, was given later. This has also had an impact on the success of the program. The training includes business plan preparation, entrepreneurship, accounting, marketing research and gender main streaming. The approach is community driven development, and the training aims at enhancing the capacity of community members in order to develop their own projects (i.e. which they consider that they are capable of carrying out and subsequently profiting from them). Although the main activities of the project are focused on facilitating loans, the project has also placed an emphasis on child malnutrition and regular growth monitoring due to the correlation between malnutrition and food insecurity. In order to address the underlying causes of malnutrition, the health office of the *Woreda* provides relevant information and education on food and nutrition even if household food availability is improved. Also, the Bureau of Agriculture, side by side with its regular activities, provides extension services with regard to fodder, animal feeding and health.

Major income generating activities include small business, goat and sheep husbandry, weaving, production of local plastic sandal shoes (*barabaso*), local drink (*cheka*), blacksmithing, dairy, ox for ploughing, fattening, etc.

The key informants argued that, based on the evaluation conducted recently by an external team, goat and sheep husbandry was less profitable to Konso than ox fattening. In practice, in many regions ox fattening takes three months, but in Konso it takes anywhere from six to twelve months. This is due to a scarcity of livestock feed, the purchase of weak ox for fattening, and/or due to the farmer's decision to use the remaining money for other income generating activities. Consequently, after one round of fattening, the farmers exhibited a tendency to switch to goat and sheep husbandry and/or other activities. The reasons for this action were that quality fodder was a constraint for fattening, and farmers preferred to raise goats in order to reduce the potential risk of losing fattened ox.

Based on the research findings, the weaving of plastic sandal shoes (in local language *barabaso)*, and production of the local drink known as *cheka*, were the most profitable income generation activities in the study area. Even there are good examples that have developed from small business to the running of flower mill from the project. Another impact is that the food gap has been narrowed from six to three months. The number of mothers who have been regularly following growth monitoring of their children has now has reached 82% - up from 27% at the start of the program. Malnutrition levels decrease when food is available, and increase when food is not available to a household. In the study area, malnutrition tends to follow a seasonal pattern. At beginning of the program, 30% of the children were underweight, and based on an assessment conducted in October 2008, the figure was subsequently lowered to 20%. These results are an indicator of the link between income and malnutrition, and also suggest that the seasonal fluctuation of malnutrition has been narrowing. The project will phase out next year and the sustainability of the impacts will likely remain unanswered.

The PSNP document states that beneficiaries (the poorest and the poor category) should be the ones who are involved in the World Bank project. It is true that the majority is from this category; however, people from other categories (for example, from the middle wealth category which are not eligible for the program) have also been deliberately involved. Group loans play a predominant role in this involvement. In this situation, rather than a single individual being responsible for the loan, groups of farmers take responsibility for administering and repaying the loans. Generally, all members of the group are poor, and since they cannot shoulder such a big risk individually, they involve people from other categories of the

community. Typically, it is a group collateral system and property collateral is not required.

In addition, most of the beneficiaries have never been involved in such kinds of business endeavors. As such, it is difficult for them to manage the business unless they involve someone who has business experience can help lead them in the process. Farmers stated that having a group without business know-how would put their business at risk. Under these circumstances they involved persons not eligible for income support into the group as long as they possessed business skills. In practice, the *Kebele* food security committee believes this approach has a positive impact and approves non eligible ones for involvement. However, this approach is against the principle of the World Bank project and remains unofficial.

Farmers have to utilize the loan according to the project they formulated. Developing the project by themselves has two advantages. One is that it gives them the direction which they think that they are capable of doing. The second is that it limits the allocation of their money. However, there are several farmers which used part of the loan for activities not included in their project. Based on the findings, it appears that, at times, the farmers develop projects as a means to gain access to the money while the loan is been used entirely for different activities not mentioned in their plan.

Marginalized members of the community, such as blacksmiths and potters, are benefiting from this opportunity and have been further expanding their activities and bringing changes to their livelihoods. More and more households are sending their children to schools, thereby reducing reliance on local lenders who demand 10% interest rate per week. They are becoming increasingly keen with respect to both market and job information. These days farmers are not selling their livestock simply to get cash; instead they study the market and if they find out that the price is lower than their expectation, they return home with their livestock. Through a heightened awareness and focus on how to make money, and by slowly undergoing a transformation towards understanding and initiating small business activities, farmers are becoming traders and money is being circulated among the rural communities of Konso. With the exception of certain circumstances which are beyond their control, most farmers repay loans. This is a positive indication that the money has been utilized for the intended purpose. Farmers in the group discussion indicated that they had a

higher interest, and considered the loan to be more beneficial, when it was combined with the safety-net program. Some farmers even suggested the possibility of raising the amount of loan they receive by diverting some of the PSNP budget. This thereby contributes to a reduced dependency on aid.

Based on the research findings, similar to PSNP, the farmers indicated that the provision of credit has resulted in a reduction of their reliance on trees during problem times. However, there were no indications that access to credit has had an impact on reducing seasonal migration. Sometimes income from seasonal migration has been used to pay loans when faced with loss of business. In addition, income from migration has been used to add up some money on loans in order to expand their business or start a new one that requires a higher quantity capital.

The key informants from PSNP and the World Bank program underlined that the integration of PSNP with other food security programs and development interventions is a critical component in the effectiveness of the program in Konso-and the success of food security, in general. Collaboration from at least three core sectors is critically required in the implementation of meaningful activities and to bring forth the desired changes. However this linkage and cooperation is lacking and each program seems to be working independently. For example, if payment of PSNP is not implemented in time it has a negative effect on the other programs. A households' willingness to take a loan is highly dependent on their ability to secure household consumption from PSNP. If payments are delayed, households are forced to repay loans, sell assets or use loans to purchase food while reducing their income generation activities. However, the linkage and coordination between PSNP, the World Bank project and other development interventions at local level has been rather weak with respect to delivering their benefits and efforts geared towards maximizing their positive synergy. This has also been raised as a challenge hampering graduation from PSNP.

Food assistance aims at enabling households, not only with respect to protecting individuals from depletion of assets, but also towards enhancing their future productive capacity. These objectives are targeted through an approach which focuses on an integrated application of various development interventions. The major activity in Konso has been natural resource based conservation and development activities such as: construction of terraces,

tree growing on public land, construction and development of ponds and springs, check-dams for gully reclamation on communal lands and on selected watershed areas, roads, public toilets, tree growing in public forests, surface water harvesting ponds on farm lands for vegetable and fruit trees and water for livestock, and school expansion activities. Each – and all – of these activities are aimed at creating communal assets.

Other than meeting short-term food deficits, the program works towards objectives such as: building and creating household assets, increasing the number of goats and cattle, tree growing on individual plots, direct assistance for those unable to work, development of cash income sources for better clothing, meeting household medical expenses, and/or sending children to school.

6.1.2 Impacts on tree growing and asset building

Experts feel that the present PSNP concentrates on communal land and this is not sufficient in bringing change to the livelihoods of people. In Konso, more than 75% of the land is privately owned and communal land areas are shrinking. In fact, in some *Kebele*s there is no communal land at all. In addition, the program places limitations on the inclusion of communal land; stating that any communal land located more than five kilometers away from the villages where beneficiaries live should be excluded from the program. The program does not encourage implementation of PSNP on private land unless it is found to be critical and well justified in the implementation of activities-even if the land is included within the watershed development plans. The experts suggest that availability of communal land varies from one *Woreda* to another. Therefore, targeting communal land for implementation of PSNP should consider the different situation of each *Woreda*. The experts also suggest that, in order to enhance the impacts of the program on achieving communal asset building, the program requires long-term and continued intervention as well as adequate flexibility to allow certain activities to be implemented on private lands (i.e. to bring changes in the short-term).

A discussion was conducted with the experts which focused on whether or not the introduction of PSNP had reduced farmers' dependence on trees during hard times. Unlike the farmers, the experts' views were mixed and their justification was based on a number of factors. They stated that, in PSNP, the benefits obtained depended on the participation of individuals or

households. The experts indicated that less participation equated to less benefits. As such, those households with sufficient labour that took part in the program and worked all months, as well as those *Kebele*s located far from small towns, were less dependent on trees during hard times. It was also suggested that these individuals were better at protecting and creating household assets. With regard to those *Kebele*s concentrated around towns, however, the experts suggested that these individuals tended to work less and get less. Their participation in PSNP was less due to the availability of alternatives and the better payments they received.

In addition, the experts have observed a heavy reliance of those *Kebele*s on the remaining few trees in the surrounding area due to a heightened in-flow of fuelwood and construction wood to the town. This phenomenon has raised another question as to why those *Kebele*s around towns continue to be dependent on forests when they have better income opportunities from non-farm employment. A similar phenomenon was observed in Konso. As a result of the new road construction in the area, people have been able to get jobs as daily labourers. This is a temporary opportunity, however, the money is often spent in town and little or no money goes to the individual's household. Often in those households there is no cash saved for urgent need. As such, the options available are trees from lowland areas or from their farms, or selling their goats and/or sheep. The reality is that farmers often cut trees in order to meet minor expenses. And, in this regard the safety net contributed a lot in protecting trees on farmlands otherwise would have been cut and sold. However, for big expenses the trees do not contribute in the Konso situation; rather they depend on sale of small ruminants which have better value.

The experts stressed that safety net is not a luxury, and with the prevailing increase in food prices it is only going to get more difficult to fulfill the food gap let alone to create new assets. In addition to the farmers' complaints regarding low payment, delayed payment has been one of the constraints in the protection and creation of assets thereby contributing to an elevated reduction of the farmers' appreciation of the safety net and affecting the quality of the activities. This situation also increased the farmers' vulnerability with respect to local lenders. To elaborate, it was observed that, although women and children are the ones participating in the activities, it is the household head that receives the payment and makes decision as to how to utilize the money. As mentioned above, due to delayed payments people

borrow from lenders and pay it back immediately when they receive their payment or spend it on other things.

The provision of cash transfers-rather than food–holds the intention of helping households meet immediate consumption needs, while also protecting their assets. In this way, the provision of cash is intended to increase flexibility over consumption decisions, heighten the avoidance of asset depletion, and improve both market development and the local economy. In addition to these advantages, cash transfers are also intended to reduce the cost of food purchasing, storage and distribution. While the cash is to be used for a wider variety of purposes, based on the research findings, the reality was that much of it was spent on purchasing food, buying clothes, and a portion of it on health and education. Few households purchased small ruminants, and few households spent it differently. Over the past year beneficiaries' preference has shifted from cash to food transfer due to rising food prices, and the low wage rates of PSNP (i.e. the current local daily labour wage rates). With such considerations in mind, questions regarding the strengths and weaknesses of cash or food-and its effects in PSNP-require a detailed investigation in order to ensure their long-term, sustainable impacts on improving livelihoods.

Women whose husbands are wasteful were one particular party which preferred that the payment should be done with food grain rather than cash. These individuals felt that food grain would serve the household better than cash. This and other issues have resulted in the question of cash or food to become a hot debate within the households and the program implementers. The program implementation manual allows the *Woreda* Food Security Task Force to make decisions depending on their local situation (i.e. to choose either cash, food, or both forms of payment).

Almost all households in Konso have consumed what they have produced. Some households stated that their purchasing power was low and the market was weak and they had no ability and to supply food grains and they feared food price rising. Therefore, they preferred payments to be done with food grains. While some other households support for cash transfer arguing about the flexibility of cash benefit and avoidance of food aid dependency which is arguable. In previous times, selling fire wood in Konso was seen as unacceptable tradition. But through time it has become one means of cash income. That being said, it has been observed that women now have to

travel long distance to collect fire wood for sale. As these resources have become increasingly scarce, trees on farmlands have been cut down either for firewood or construction or as a means of income generation. Earlier people cut and sold trees from the lowland forest areas or from their own farmlands in order to overcome their immediate cash needs. With the introduction of PSNP and credits, the respondents believed that, even if such programs do not stop the aforementioned tree-cutting practices, they have reduced individuals' reliance on trees for fulfilling household needs during hard times. This, however, does not mean that they do not cut trees at all. When wood is needed for the construction of new houses people cut trees, and if they have the money from migration they can buy additional wood from other farmers. Moreover, the availability of tree resources is declining and the demand is rising. This thereby motivates people to grow a higher number of trees for household uses such as construction, fodder, food and cash income.

Considering this phenomenon, several respondents indicated that prior to the introduction of PSNP (and even during the Derg period), Development Agents and extension services were teaching them about environmental conservation and tree growing, while also providing them with tree seedling. However, due to a lack of awareness on the side of the individuals, there was little or no subsequent implementation of strategies following these teachings. At present, it is not only the introduction of food security programs that encourages tree growing, rather, of equal importance, is the increasing scarcity of wood for construction, fodder and fuelwood. Tree seedlings are distributed to the communities even though the preferred species are not available. As such, the programs encourage tree growing on both communal and private lands, albeit with a greater emphasis on the former.

The newly initiated employment and income opportunity mechanisms have enabled the local people to get involved in various income creation activities. Based on the research findings, one key example of these activities is fattening programs. Others have been involved in goat and sheep husbandry, and small businesses are being initiated. In many cases the income from seasonal migration has been used for household consumption purposes. It is seldom used in building asset, as the earning is very low. The significant impact is that the income generation program has promoted the protection of trees on individual farms and growing on communal lands. A

household head who has left for seasonal migration has his land and trees protected during his absence. Typically, under these circumstances, there is no serious harm to his land and trees. However, this tradition is changing.

In Konso, women and men work equally in the fields. However, it is often the household head that makes the decision on landuse. One of the disadvantages of seasonal migration is that, in the absence of the household head (i.e. assuming that it is a male household head), the spouse is not allowed to either grow trees or to cut trees from the farmland. Often, when the household head returns from his seasonal migration, he comes back without money so he has to sell the trees.

Migration and PSNP public works follow a certain seasonal pattern often taking place at periods outside the cropping season. Most stay in the villages during the cropping seasons which also coincide with tree growing season. As such, seasonal migration, PSNP and other non-farm income activities have helped in retaining trees and other household assets from being used for short-term consumption, particularly during bad seasons. One farmer emphasized this point when stating that "before the introduction of PSNP I sold all the matured tree from two plots I owned. This has not helped me in overcoming my problem then I contracted out one of my plots. After becoming a beneficiary of the PSNP I use all the crop from my farm and partly from PSNP for consumption. With the rest of the earnings from PSNP I could pay my debt and returned back my plot. Additionally I bought two sheep. I have never sold trees after becoming a beneficiary of the program. However if you have a problem which is beyond your capacity there is nothing that prevents from selling trees and if that is not enough you sell goat or sheep you own, or go to local lenders".

6.2 Perceptions of local actors on food aid

6.2.1 The experts' view

This section attempts to examine the perspectives of major local actors with respect to whether or not the programs achieve their objectives at the household and community level. In Konso, thirty five of the fifty *Kebele*s have been participating in PSNP. The criteria used to select *Kebele*s were: observed food gap, those who received food in the past three consecutive years (or repeatedly), poor farm resources and land productivity, and those

with less opportunity for non-farm employment. The five-year government food security strategy comprises PSNP for chronically food insecure people. Other complimentary programs included are credits, agricultural services, and the resettlement program. PSNP, as part of the Food Security Program, emerged as an alternative to food aid. This program is founded on principles which are intended to save lives and break the perceived dependency cycle, while subsequently moving away from an emergency relief program. It is achieved through provision of increased development assistance by protecting, creating or rehabilitating the assets of the community and households.

With regard to the conceptualization of the aim of PSNP by the beneficiaries, experts of the program stated that in the past three decades the Konso people have been assisted with food aid, but the outcome had not been satisfactory. Intensive orientation was given to the communities at the start of the PSNP. PSNP is one of the government food security programs aimed at assisting the community by creating employment rather than providing free handouts. The experts believe that beneficiaries are clear on the concept of the program, but they lack complete understanding of the aims. In spite of the intensive orientation, their views are varied. The first reason is that their past experience and perception with food aid has not changed significantly over time. In the past, everybody who registered for the program was entitled to get cash or food without serious evaluation of the accomplishment of the activities. The second reason is that PSNP is implemented on communal lands with the idea of creating communal assets through natural and public resource development and conservation (e.g. maintenance of schools, health posts and road construction etc.). However, beneficiaries lack common interest in developing and conserving communal land natural resources, as there is a lower sense of ownership in these areas. A lack of clear guidelines for benefit sharing from collective undertakings has, to some extent, contributed to a lack of interest in building communal assets. This is evident and is reflected by the lack of quality of the work undertaken, high turnout of children and women for heavy labour and demanding activities, and individuals either temporarily or permanently leaving PSNP when better alternatives are available.

According to the document, graduation is a long-term, two-stage process, where the first stage is food self sufficiency and the second is food security. To achieve this, the former requires the inclusion of other food security

interventions, while the later requires the inclusion of other rural development interventions and macro economic development. However, other food security programs have not started at the same time in all *Kebele*s that are beneficiaries of the safety net program. This has been an obstacle in asset creation and graduation from PSNP during its first stage (i.e. which is supposed to make people food self sufficient). An assessment for graduation was done after three years of the program implementation and out of 74,000 beneficiaries, only 1,215 have graduated. As such, the prospect for substantial graduation from the program and to attain the status that they no longer need a safety-net looks to be a long time coming in the study area.

6.2.2 Views of key informants

One of the key informants recalled that the first food aid program started in 1973/74. Despite the continuing food aid, assets have been depleted with each subsequent shock. The PSNP aims at linking food aid and development and protect the assets of vulnerable households from shocks by promoting their participation in various development interventions. These approaches by the government are designed to get rid of emergency aid from peoples' minds through involvement in public works for environmental rehabilitation and/or through the increase of credit services that contribute to improved life and enable them to become self reliant. However, the experience with food aid has put a lot of pressure not only on the people, but also on agricultural practices, and it is not easy to avoid this dependency. Our knowledge about indigenous measures should also be part of the solution. The respondent added that, although there are people who have made a difference, the asset building aspects of the program's objectives have not been achieved for a considerable proportion of beneficiaries. This result indicates a demand for the continuation of technical and material assistance from the programs - at least to generate modest asset.

Another key informant said that "the first food for work program in Konso started by Evangelical Church Mekane Yesus in 1973 following a drought period in the area. Later this was continued and expanded during Derg time. At that time there was a disagreement between experts and the local people on construction of terraces. Due to lack of technical skills the terraces were improperly implemented making the farmers unhappy who have long-term experience on this. However the technicians forced the communities to implement new terraces replacing the traditional ones. If farmers refused to implement them they were refused to get the food aid. In order to get the

food assistance the farmers became willing to implement the new terraces. However, after receiving their food they demolished the new ones then reconstruct their traditional terraces. Also there were few farmers who demolished their terraces in order to get food aid for maintenance work".

As such, it is clear that relief aid has been going on for several years in the area. The key informant said that "when introducing a new intervention there is always a side effect. Dependency of the Konso people on food aid seems to be exaggerated. It is actually the fear of donors and aid organizations. Among the Konso areas much dependency of food aid is more prevalent in *Kebele*s that are found around the town than that of the rural areas. In general dependency is not severe in Konso compared with other areas. The recent PSNP program aims at eradicating the sense of dependence. It has helped in bridging household food deficit, able to send children to schools and better clothing are some of the impacts of the program. The payment should be timely and need to be flexible and adjusted according to prices of grains in markets".

Currently, with the help of PSNP, thousands of seedlings are raised and planted year after year for environmental rehabilitation, as well as to overcome the shortage of products and services from trees. Most of the planted tree seedlings have been left to grow without proper care; thereby leaving it to nature in order to continue their growing process. Often in Konso, where the sun is intense and nature is not overly accommodating to newly grown plant species, the effort made in tree growing eventually becomes fruitless and ultimately discourages people. In addition, it is also important that the nurseries are able to produce tree seedlings that fulfill the necessary environmental requirements for growth, as well as match the needs of people with respect to the types of trees being grown. This, in turn, is dependent on the people's participation in the species selection. Considering the findings from this research, it is suggested that emphasis should be given to multipurpose tree and shrub species and in strengthening the existing traditional agroforestry landuse practices in order to help meet the various needs of the communities (i.e. with respect to both income and environmental benefits).

6.2.3 Farmers' view

As PSNP is intended to contribute to changes on the livelihoods of the people, it is important to understand how rural communities-in particular

beneficiaries-perceive PSNP as a development intervention to ensure food security. In general, based on the research findings, respondents had similar views, interpretations, and perceptions of the objectives of the program.

All the approaches of the program are aimed to ensure food to chronically food insecure households, to reduce their vulnerability to shocks, and to increase their productive capacity at both the household and community level. The program has been working well in smoothing consumption and protecting assets for many households; particularly with regard to bigger families who have adequate labour to participate in PSNP. However, in labour constrained poor households with a large number of dependents, PSNP is less effective. The most common impact indicated by the majority of respondents was that the benefits obtained from the program have been almost entirely used for household consumption; mainly to purchase food and, and when possible, other household expenses such as clothing and medicines. Often, part of the money was also spent on repaying earlier loans from local lenders or spent to reacquire dwelling or farmland that has been used as collateral with private lenders. On the other hand, due to poor management of the money, some spent it on buying drinks. In bigger families, where many of family members are under working age or if many of them attending school, it is unlikely to build assets as the payment is structured based on the number of household individuals participating in public works projects.

Another constraint to asset building is late payment and/or when all unpaid payments are not paid at once. Often the grain or the cash arrives three to four months after completing the work. Based on the findings, there were a considerable number of people with nothing at their home, and many who abandoned farming (for various reasons) were becoming fully dependent on safety-net programs – and, often, considering it as their only major means of income. As such, if the payments to these people are not timely, the remaining option available to them is to borrow money from local lenders. This further prevents them from creating and building assets, and in some cases, leads the household into severe indebtedness. However, those with little grain in their store, or who owned little in the way of assets and had few dependents (say 2-3 children), had the chance to build some additional assets (albeit, somewhat small). There were also very few farmers that were able to build additional assets. For example, in a good cropping season, some safety net beneficiaries were able to build assets through the purchase of a

goat or a sheep. It should be noted, however, that if the next season is bad, the household typically consumes what they had earned from PSNP. For those households where the farming activities were entirely done by the household head, it has reduced the frequency-or even stopped–migration, thereby requiring them to work for longer periods of time and maintain their farms better than before.

Based on the findings in this study, the safety-net has in fact served to improve the asset-base for certain people. In addition, PSNP and credit programs have reduced the peoples' reliance on local lenders. Perhaps with these (and other) aspects in mind, the farmers expressed their feelings about what will happen if the program is terminated. The farmers, when considering the vulnerable character of their situation, were suspicious or had little confidence regarding the sustainability of the asset-base being created from PSNP – particularly with respect to it enabling them to cope up from a single shock. The farmers indicated that the impact of a single drought could affect the majority of the community; however, the effects would be more pronounced on beneficiaries who could not create their own assets. This finding suggests that their livelihoods are so unstable that even a small drought could push beneficiaries back into their previous situation. What the farmers underlined was that, in essence, only those with initial assets at the time of participation in the program could ultimately make improvements to their own asset building.

Other respondents pointed out that with the current amount being granted from the safety net (which was recently raised from Birr 6 to Birr 8), and with soaring grain and livestock prices, it is impossible to build assets. In addition, the work norm to be accomplished by individuals is high. Some participants living close to town (i.e. in the district) have left PSNP because of delayed and low payment and/or better options. Also, the respondents indicated that building assets is unlikely under safety net programs unless they are combined with other income generating activities. This is also stated in the PSNP document, which indicates that graduation is a long-term process that it will not be possible if only PSNP resources are used or available. As such, adequate asset building requires the same households to receive other food security program interventions as well as other developmental interventions.

Respondents said that those that were not able to graduate, the only options were to continue on the out-migration or to look for non-farm employment opportunities in the surrounding area, or to join the resettlement program. One participant said that, "previously, participants were paid more than the work and that they thought that it was almost free. This was the best opportunity for them to create asset. Now, with the development and implementation of work norms, they found that the payment is low because it is paid according the quantity of work each participant performs. As such, those of the beneficiaries who have not brought change in the past three years of the project are unlikely to graduate in the remaining one year". For the majority of the beneficiaries there is no hard fact that PSNP has increased the income of households or increased their productive capacity through provision of food items. And, as such, sustainability of the assets being created-that will help bring continued benefit to the beneficiaries, or the community in its entirety-is a critical component in achieving long-term benefits from the project.

The residual effect of PSNP has been evident in that it has become quite common for individuals to demand payment for development activities being initiated in the area. So if a free labour is requested by the implementing body of certain project, those who are not beneficiaries of PSNP often complain and argue that PSNP participants are the beneficiaries, and they should be the ones who contribute to the labour. However, the two public development working days in a week are free of any incentives and the activities are not under the program of PSNP.

Food aid actually started during the last period of Emperor Hileselassie. This was continued and expanded during the Derg period with direct assistance and the food-for-work program. However, due to extreme corruption at the time, individuals did not get what they were supposed to get. Rather, much of resources were going into the pockets of the foremen. On the contrary, the current PSNP is quite transparent. The aim is different from the previous food for work program. At the beginning the payment was done without strictly following the standards and the work norms. Recently, however, they are closely following the work norms so that every payment is done according to the achievement of individuals. Some framers who work below the standards get low payment, and as a result, leave PSNP. This phenomenon occurs particularly with respect to those that live close to town, where they have other income alternatives. The recent increase of

payment from 6 to 8 birr a day is a good thing, but does not adequately help to overcome (the current) soaring food prices.

The experts advised the beneficiaries that they should be ready, and have to establish an exit strategy as the PSNP is remaining for only one more year. The development interventions implemented on public, and to some extent on private, lands (such as terraces, trees grown for fruit, fodder, construction, etc.) are some of the preparations being made for their exit strategies, in addition to the assets they have accumulated during the course of the program. However, it seems that the beneficiaries are not ready and, based on this research inquiry, they underlined that it was too early and too limited to draw firm conclusions about the impacts of the activities. There might be few people that will manage to cope if faced with crop failure. On the other hand, there will be others (the majority) who will not be able to manage.

It is four years since PSNP started in the area. Each year there is a food security assessment conducted by the community food security task force to check whether or not a household should continue in the safety net program or graduate. The farmers estimated that if one out of five safety net program participants graduate at the end of the program, it can be seen as a good achievement. Others expressed that their dependence on government aid must continue as long as food security problems exist in the area. All of these indications suggest that the Konso peoples' perception of free food aid has not yet changed.

6.3 Implication for development planning and policy

In the past three decades Ethiopia has received a huge amount of food aid from various donors; via emergency assistance and safety net programs which link and emphasize relief assistance with development, and are aimed at reducing food shortage. The annual volume of cereal food aid has ranged from 200,000 metric tons to about 1.2 million metric tons, or between 3.5 and 26% as a proportion of total domestic food grain production over the 1985–96 period (Clay *et al.*, 1999). Konso is one of the 64 *Woreda*s classified as chronically food insecure in the region and has been one of the beneficiaries of this program.

Most of the PSNP participants are those in the poor/poorest segment and are selected based on wealth-category prepared earlier (and revised every year). In the study, it has been discovered that 77% of the sampled individuals relied on food aid and safety net programs. The payment was both in grains and cash, of which an individual is entitled to get either 500 grams of grain and 150 grams of edible oil, or, in cash, an equivalent of 8 Birr per day. As in some other places in Ethiopia, Konso has been in constant crisis and there have been continuous handouts of food aid. In addition, in the area, food aid dependency seems not to be declining; rather. At times Government and NGOs working in the area often have to divert their development resources to emergency and relief assistance. In addition, previous humanitarian approaches-which most agree have failed-have created a situation of dependency and have led to an inadequacy in addressing the problem of drought.

Ethiopia's official food aid policy states that no able-bodied person should receive food aid without working on a community project in return. However, there is a greater concern and debate both by the Ethiopian government and donor agencies, on the growing dependence on food aid, including the associated potential long-term impacts of its implementation, as well as its effectiveness in addressing development issues and targeting those who need it (Jayne *et al.*, 2002).

Food aid/cash for work programs are considered to have an advantage to households in providing some security; provided such aid is combined with improved production and new initiatives or activities which will strengthen not only the household food situation, but also the economic status of the household. Humanitarian assistance, despite its urgency and necessity, has some harmful repercussions on the community; it makes them passive recipients, damages the work culture, and ultimately creates dependency. In addition, development resources are diverted to avert crisis situations. It has become habitual that people develop expectations such that, when there is a development initiative, the first question by the community is if such an initiative involves food aid or cash within its implementation. This is because most of the development activities thus far have been implemented and assisted by food or cash for work programs. The residual effect is in the minds of the people such that - even now – it is regarded that every activity should be paid either in cash or food grains.

Participants agreed that food aid in development activities has been reducing the interest of the community to work, and that interventions would become unsustainable in the long-term. However, the farmers believed that some interventions-such as school construction, health posts/clinics and roads-may be difficult to implement by the community alone, and, as such, some contribution from government and non government organizations is still important in the process.

The positive contributions of PSNP in addressing the food gap, retaining household assets, and, to some extent, creating assets, are duly noted, the program in Konso does not yet address the problem of food security in long-term perspective. The PSNP appears to be transparent and well targeted to reach the poorest households. However, due to the quota system, not all of the poorest categories are participating in the program. The requested amount of resources by the Community Food Security Taskforce after approval by higher bodies is sent down to the communities and the new figure is often less than the requested resources; and, as such, it always puts the task force in a difficult situation in distinguishing households belonging to the same category. This, in turn, creates social tension. Also, based on discussion with the community, it was discovered that those screened out from the program (i.e. due to the quota system) hoped that another program would start to support them. In some cases, this increased competition to get involved in the program, is creating conflicts. For example, non beneficiaries complain that PSNP participants should conduct volunteer development activities. They also pose complaints regarding paying taxes to government. The program, however, is under-resourced in terms of facilities, and the *Woreda* food security committee lacks effective management and implementation capacity to enable them to effectively carry out the program with respect to items such as (but not limited to): early and timely release of budget, monitoring and evaluation, coordination among sectors, and line ministries.

Even though it has not reached every *Kebele* and village, the efforts with respect to water, education and health services are now closer to their villages. In general, the farmers thought that the improvement in infrastructures in Konso - such as roads, electricity and telephone – have and will improve the market situations, and will aid in providing job opportunities, enhancing seasonal migration, and increasing the potential market for their tree products (which will encourage further expansion of

trees). The communities discuss and approve wealth categories and decide who participates in the World Bank food security and productive safety net programs. Currently, people are able to move freely and more safely within and beyond the *Woreda* for seasonal out migration and other reasons. Robbery has been reduced and people are better able to come back to their areas with what they earned from out-migration.

The current decentralization of administration power to *Woreda* level has enabled the communities to establish their own power for self governance, and has given them better control over their social and economic development affairs.

The story from the farmers and key informants convey a similar message; the food security objective has not been achieved by the government and NGO food aid programs. This raises several questions, for example, why has food security remained an unachievable struggle for Konso and similar areas in Ethiopia? And which food security interventions need to be reviewed to achieve food security?

Development assistance is useful where recurrent drought and chronic food insecurity exists and where people are vulnerable to shocks. People-centered development strategies that build on the capacity of the needy individuals, and that provide opportunities which enhance coping capacity and resilience, could ultimately minimize the negative impacts of both natural and human-made calamities.

7 Status and importance of local institutions

7.1 Local institutions and their functions

Informal institutions are defined as socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels (Helmke & Levitsky, 2004). These institutions include cultural norms, mechanisms, beliefs and social networks. Informal institutions are widely considered as one of the key elements in promoting beneficial development outcomes. The aim of studying informal institutions in this context–for example, as part of this research in Konso-has been to draw out relevant information on institutional issues concerning their importance and function over time, and their expected role in natural resource management (NRM). This study also aims to address issues related to prevailing development interventions, and to help determine which institutions could be considered capable – and, subsequently, how their role could be enhanced and integrated - in the development interventions in the study area.

Every community has its own traditions, beliefs, customs and social norms that govern the interaction between people and their environment. They are complex and dynamic, embedded in people's culture and traditions, and are passed from one generation to the next. Protecting local traditions, preserving cultural and natural heritage, managing the environment and natural resources for their livelihoods, as well as mediating conflict over the use of natural resources, have been the common functions of most rural

informal institutions. Studies in livelihoods should not only focus on a conventional economic analysis within the household, community and/or production sector; rather, it is also necessary to take into account the normative and cultural dimensions that shape livelihoods (Long, 1997).

The major institutions in the area with different functions are subsequently outlined. *Paleta* is a *Kebele*-level organization, whereas *Kanta* is a sub-organization of *Paleta*. *Xelta* is the ruling generation of *Kebele/Paleta*, and is based on a two-(or, in some *Kebeles* such as Mecheke, three-) generation grading system - namely *Kalkusa, Melkusa* and *Herpa* - that rotate every 7 or 18 years. *Aba Tinpa* is the executive court of *Paleta*, and is responsible for traditional administration. The authority is assumed to be one year and is often rotated between certain families. *Kafa* is the labour organization based on clan unit within and beyond the *Kebele*. *Parka* is a labour sharing task force (composed of freely organized working groups which are of temporary nature). *Alumela* is a kind of *Parka*, but is organized to provide hired labour. *Parka* and *Alumela* are the most common forms of labour arrangement in Konso. *Edir* is the traditional community organization in which the members assist each other; mainly when performing burial ceremonies and also to assist both financially and labor-wise for proper burial of the deceased family member. In Konso, different types *Edir* are organized under the *Paleta* level, the *Kanta* level, or the *Kafa* level.

7.2 Role of informal institutions in NRM

The institutions of Konso facilitate and organize development activities, work in emergency and crisis situations, and administer and implement local bylaws and other social services for the community. Among the different traditional institutions in Konso, *Xelta*, led by *Aba Tinpa*, is the prominent institution; although its power and function has diminished over the past decades. The functions of informal institutions in the study area have been to protect people's traditions and culture, facilitate negotiation, and to help prevent or reconcile conflicts between *Kebele*s and individuals (i.e. stemming predominantly from boundary-related conflict) through their regulations and rules. The protection of *Paleta* forests and communally owned forests, construction and maintenance of communal water ponds, construction of roads with in villages, and fencing of villages are some of the functions of the *Apa Tinpa*. The protection and coordination of uses of the traditional and the recently constructed ponds by government and NGOs, is entirely left for

the institution. Terracing which has been a traditional practice for generations, and is now being implemented through PSNP. This has been supported by *Apa Tinpa* and the community has been encouraged to participate in the construction of these structures. Any development or activity that benefits the community at large, such as ponds, roads, schools and clinics that take land from individuals, requires the support of *Aba Tinpa*, who is instrumental in convincing the individual farmers to give their land and does so often without any form of compensation.

At present, regarding the current importance of informal institutions in Konso, the farmers indicated that some had been abandoned, while some had changed their form and roles. In many cases, institutions such as *Parka* and *Alumela* are becoming even stronger than before. *Parka* is a freely organized work group with indefinite time and is mainly composed of men of the community to perform major farming tasks. Women can also be organized as women *Parka*. The arrangement is one of rotating labour: i.e. the person requesting the *Parka* for his land is obliged himself to work on another persons land who is a member of the same *Parka*. The organizer provides food and drink for group members working on his farm land. Often, people organize under *Parka* for one season during land preparation and weeding, *Parka* is subsequently abolished, and a new *Parka* group is established the next season. Where the men's *Parka* mainly involves ploughing, weeding, harvesting, and maintenance/construction of terraces, the women's *Parka* could be formed for weeding and harvesting days, and they are responsible for transporting and application of manure on farmlands. Though *Parka* still exists, some are slowly becoming unwilling to tie themselves to working all day for just food and drink because of the growing monetization of labour. This is particularly evident when it comes to tasks that require heavy labour.

The foundation of *Alumela* is *Parka*. Often, the members in *Parka* are young and have the ability to deliver heavy duty labour. It is permanent in nature, with rules and regulations that govern the working group. There are *Alumelas* that are as old as 30 years. *Alumela* provides hired labour for both farm and non-farm work (e.g. construction of houses). They work for farmers with big land and less household workforce. The money obtained from *Alumela* is kept and is used mainly for Easter and New Year festivals. A member in short of cash can also borrow money from the savings.

At present, the other strong working tradition is the traditional court under *Apa Tinpa*. Locally, it is called "*Mehala*", which means "one plead guilty or not guilty by swearing". But before this plea is made, *Apa Tinpa* attempts to convince and ask the suspect to speak the truth and confess by presentation of evidence through a recollection of the bad things that happened on those who denied the truth a just by God. Many people prefer to bring cases related to money borrowing, which are agreed or done without evidence and/or witnesses between two parties, and/or theft. The first reason why people bring cases to "*Mehala*" is that people still believe that someone who denied the crime which he/she has committed will be punished by God sooner or later. The second is that the formal *Kebele* court (or, social court) does not see cases without evidence and witnesses. The third reason is that the process in the *Kebele* court is a lengthy one. The long process is not because of number of cases seen in *Kebele* court, rather it is due to a lack of incentives and capacity.

Xelta through *Apa Tinpa* used to play a significant role in the protection of natural resources. However, most were criticized as being backwards and were undermined. This created infringement situation where many *Paqola* forests (i.e. forests owned by descendents of the first settlers, for example the Gela forest and Bamale forest), *Paleta* (i.e. public forests under the jurisdiction of *Apa Tinpa*), and other forested areas that were protected as sacred forests for many years were not properly protected and used. Most *Paqola* forests are now left with few patches of trees, and the ritual ceremonies in these forests are still continuing. During certain times, particularly drought periods, people were allowed to let cattle to graze in these forests. Without the permission of the *Paqola*, though, no one is allowed to cut the trees. If some one is found cutting the trees, the individual will be fined by *Apa Tinpa*. As trees are expensive, the punishment is high. This deters people from conducting illegal cuttings. This also applies to trees on farmlands.

Apa Tinpa is not much involved in enforcing some activities on individual farmland. The construction of terraces and/or the growing of trees on individual plots is left solely in the hands of the owner. However, *Apa Tinpa*, advises people on the importance of conservation, and talks to farmers who are frequently cutting trees on their farm, or those who do not maintain their terraces that could affect other farmers' plots. *Apa Tinpa* implements regulation and protection of traditional ponds. They also help to

organize various activities, such as soil conservation and tree growing activities on private land, particularly for those with little resources. In general, at present, *Apa Tinpa* is more involved in issues of culture and in partly enforcing customary laws - mainly with respect to resolving boundary conflicts - rather than in general development issues.

Under the past regime i.e. Derg, informal institutions were seen as unimportant, and the regime was seriously interfering and undermining them. During the *Derg* time, the cadres had put a lot of effort to disband *Parka*, and, as a result, there were many farmlands at the time left uncultivated because of labour shortages. The cadres were preaching them to organize into producer cooperatives rather than *Parka*. *Paqola* and *Xelta/Apa Tinpa* and *Mora* had been under big pressure during the *Derg* time, and even had to stop their functions. Due to these circumstances, some institutions have disappeared. Others became completely powerless but managed to survive and have started to restore themselves during the current government, and, in certain areas, are working actively but have never been able to completely regain their earlier role. In spite of heavy influence from the formal institutions, there are situations where the local community prefers to bring certain issues to the informal institution rather than to the formal ones.

7.3 The role of state and other actors

Development agencies, NGOs, and scholars have been promoting local public participation in order to improve natural resource management and other rural development endeavors. The role of institutions in natural resource management and rural development has received increased attention. Many studies emphasize that natural resource management programs would have to become more embedded in the informal institutional environment, which could, in the future, serve as a basis for more genuinely community-based local development initiatives. With regard to the importance and role of informal institutions and communities, Agrawal & Gibson (1999) stress that while previous work on development considered communities to be a hindrance to progressive social change, current writings champion the role of community in bringing about decentralization, meaningful participation, and conservation. Decades of strategies on resource management and planned development have resulted in poor outcomes and have forced policy makers and scholars to reconsider

the role of the community in resource use and conservation. The top–down development approach has become increasingly incapable in protecting natural resources, and, as such, there has been increased emphasis that those at the grass-root level-and located in close proximity to the resource-could manage better than other actors. Decentralization aims to improve participation in order to advance efficient management and development of natural resources which helps in leading to equitable forms of use.

During the *Derg* period, most development activities were planned centrally, and brought to the community from above. The planned activities could be beyond or below available capacities, and could be entangled with a great deal of corruptions. Based on the research inquiry, people in the study area stated that currently the communities discuss the development activities with the *Kebele* executive committee and decide whether to accept or reject new proposals. An example where this can be cited, which included a rejection from both the informal institutions and the communities, was the development activity involving micro-ponds and bench terraces. Furthermore, there are even communities in some *Kebeles* that prepare their own development projects.

The respondents indicated what responsibilities and authority was exercised by both the formal and informal institutions. For example, the informal institutions have never been involved in any political activities, and the prime task of their traditional authority has been towards protecting the traditions and culture, mediating land conflict, and ensuring peace and harmony within the communities. Based on the research findings, most boundary conflicts between (and within) *Kebeles*, as well as other property related cases, were resolved by the informal institutions. Cases involving crimes that resulted in human physical injuries - which were resolved by the elderly within the communities in the past - are now only seen by the *Kebele* social court or the police. Cases without evidence are still seen by the informal institutions. Whether the charge was brought to the informal institution or to *Kebele* social court depended on the person who brought up the case. However, once a case is brought to informal institution it can not be taken to the social court, or vice versa.

There were also conflicts between the informal and the formal institutions; mainly with the *Kebele* Administration. One area of conflict is with respect to theft and illegal cutting of trees from public areas and individual farms.

Based on the research, the informal institution argues that it has developed well established rules and laws for punishing offenders. They believe that that these rules/laws serve as a deterrent from doing it again (i.e. high financial penalties) than the formal one. The *Kebele* Administration insists that the rules and regulation laid by the government must be respected and has the legal authority to prosecute those who do not comply with the law in any case associated with trees. As such, even cases related to trees that are settled by the informal institution come to the attention of the *Kebele* Administration, and the offender could be charged for not following the legal procedure and undermining the court authority.

Another source of conflict is that the local institution needs the involvement of all eligible farmers in order to participate in PSNP. Due to a lack of resources the *Kebele* Food Security Task Force uses a quota system, and select household beneficiaries that they consider to be the most destitute among the poorest category. The institutions, however, have been demanding the rotation of beneficiaries amongst the entire poorest category. As this was not possible, in some *Kebele*s PSNP participants were obliged to give 20-25% of their cash or food earnings to *Aba Tinpa*; which was to be distributed later amongst the poorest community members who could not get the chance to be involved in PSNP. This has been a big conflict between the *Woreda* Food Security Task Force and the institution, and while the task force believes that they have resolved the situation, a few *Kebele*s are secretly continuing with it. The participants of PSNP argue that this is against the principles of PSNP. However, due to the social perception that still prevails on cooperation during hard times and for fear of social and economic isolation which they would face, they have been forced to share what they have earned. This also could be argued that participants of PSNP used it to build their social capital.

There is another difference between informal and formal institutions with regards to the activities and authority they impose. A *Kebele* is fully responsible for implementation of development and political activities. The former, however, requires consent from the communities rather than merely being a decision made by the informal institution. And, as such, the informal institutions pay a higher level of attention to cultural and traditional issues. Thus, while the informal institutions generally have a greater degree of independence and autonomy with regard to certain practices, the *Kebele* Administration is more influential given the range of power it has on various

aspects of the communities' day today life. In reality, however, the involvement of informal institutions in development programs within the study area may be characterized as minimal, and in some cases non–existent; with the informal institutions often being overlooked by development agencies.

At present, the issue of culture is gaining importance in Konso. There are two major reasons for raising the issue of culture. The first is that there are increasing boundary conflicts between *Kebeles* within the *Woreda*, as well as between the *Woreda*s. The existing political and formal institutions have been unable to resolve these conflicts. With this in mind, the reason for the community members' preference to involve informal authorities is that taking disputes to a formal authority (such as the court) may deteriorate the relationship between the disputants, and may result in significant time delays due to the procedures of the formal justice system.

The second reason for the issue of culture gaining importance in Konso is that a local NGO known as PARKA, which is an Association for Environment and Cultural Protection, has been working for the promotion of culture and environmental protection in the area. This NGO has contributed in enhancing the awareness of the community on the importance of culture and its role in their livelihoods. It has been working on restoring and strengthening local culture, and operates based on the principle of culturally-based environmental protection; i.e. conserving sites of cultural heritage and biological diversity, and by providing support to local development and natural resource challenges in order to help people improve their livelihoods. Other reasons for heightened cultural awareness include the lengthy process needed in courts, increasing crime cases being seen in courts, false witnessing and corruption in the justice system, and growing theft of cultural heritage (e.g. the stealing of an artifact known as *Waka*, a carved wooden sculpture, which not only symbolizes the heroes of Konso but is also associated with spiritual and traditional beliefs).

Power transition from one *Xelta* to the other is presently conducted; however, the number of followers of such tradition is declining as people are more highly exposed to changes and modernization. In addition, most people are converting to the religion of Christianity, and consequently the tradition is being seen as a harmful and is slowly being abandoned. Also, people cannot afford the expenses for such ceremonies and being naked at

power transition ceremonies is not accepted today. In fact, there are traditions which the present Konso people reject; for example, the custom of *Feryuma*, which enforces the prohibition of birth before marriage at a certain age. This rejection is because one is only allowed to marry during the time of his own *Xelta* (*Kalkusa, Melkusa* or *Herpa*). When pregnancy occurs outside their *Xelta*, the woman must abort the unborn, or as has been conducted traditionally, become an outcast. Early engagement of girls at age of five or six, as well as long and extravagant funeral ceremonies and processions have also been abandoned. In general, people agree that the culture still exists, and while a few people stick to their culture, its role is declining over time.

The participants suggested that if informal institutions are supported and strengthened they could potentially be useful in the planning and implementation of livelihoods enhancement programs, environmental protection efforts, and other activities. More specifically, some examples that were suggested with respect to how informal institutions could contribute to development efforts in the area included: the contribution of locally available resources which are required for particular activities, labour mobilization, by-law enforcement (i.e. with regard to access and use of common resources), and the use of local knowledge and expertise.

8 Living with adversity and vulnerability: the challenge of adaptive and coping strategies

8.1 Explaining causes of vulnerability and chronic food insecurity

As of the mid 1970s, Konso has been under increasing risk of crop production variability and failure. At present, the traditional land management and agriculture practices that enabled Konso's households to adapt to difficult environmental conditions are showing signs of weakness and inadequacy. The land management practices in Konso's harsh climate shows the specialty of the community and its distinctive features. It has been regarded as an example to be followed by other people in the country. Konso has a magnificent agricultural landscape but exhibits a reality which does not match expectations associated with that viewpoint.

Considering the livelihood vulnerability issues in Konso, my research showed that a wide range of factors - ranging from the biophysical and demographic context to economic and social variables - have influenced the food situation in the area, in terms of both availability and accessibility. When compared to moist areas, rural communities living in dryland areas suffer more greatly when drought occurs. The dependency of the Konso people on rain-fed agriculture - coupled with limited economic, technological and human capacities - leaves these households vulnerable in the face of unpredictable rainfall. Dependence on unreliable and low-productivity rain-fed agriculture may well be the primary determinant of

household food insecurity in Ethiopia but also suffers from limited technology and farming practices(Kaluski *et al.*, 2001; Devereux, 2000). And, as such, when drought occurs, the communities lose their means of livelihoods. The majority of households indicated that in the past three decades, rainfall quantities and patterns have fluctuated significantly, and the frequency of drought has increased substantially. As such, the respondents identified these issues as a major environmental shock to local livelihoods which often result in food crop failure, decrease in livestock feed and reduced water availability (for both domestic and livestock consumption). Most of the households produced less food than the amount they needed for any year. In addition, the observed phenomenon of short drought cycles increases the difficulty for livelihoods to adequately recover and withstand the subsequent drought incident. Consequently, each drought means more relief assistance for these communities and an increased dependency on outside aid. Rainfall is not the only problem; the availability of water for irrigation is also an issue. Konso does not have many permanent rivers. And, while an irrigation development has recently been started by the Ethiopian Evangelical Church by Mekane Yesus at the Segen River in the lowlands of Konso, the irrigation structure at the Delbena River has not been functional for over 10 years. As such, the only sources of water in the long dry seasons are small ponds and wells.

In addition to the climatic factors the households of Konso face, soil nutrient depletion has been identified by farmers as another principal cause for decreased crop yield over time, due to reduced inputs that maintain the nutrient level. For example, the respondents indicated that there has been a significant reduction in cow dung application. Considering this and other issues, it is apparent that the increasing population pressure on land has made it impossible to continue traditional agricultural methods (i.e. fallowing).

While vulnerability to drought and declining soil fertility in Konso are key concerns to be taken into consideration, they should not be viewed as the only factors contributing to livelihood instability. Rather, chains of events and multiple factors are contributing to the vulnerability situation. Based on the research results, the communities are well aware of the issue of rapid population growth and its corresponding impacts. The research results indicate that the existence of a high fertility rate, a rapidly growing population, and a low literacy rate are also contributing to vulnerability in the region. This increasing population pressure has led to shrinking

landholdings, and has resulted in over-cultivation and declining soil productivity. These factors have subsequently contributed to low crop production and heightened food insecurity. And, as a result, households are unable to create and invest in agricultural and non-agricultural activities such as education, health, etc. Ultimately, when projecting to the long-term, the cumulative effects of such issues will likely lead to a high population density (note: this is already observed in many places) in comparison to a relatively small quantity of resources, as well as increased landlessness and unemployment. In short, rapid population growth draws down household savings and capital investments in production methods. These circumstances compound the livelihood difficulties in the area, resulting in lower productivity, heightened marginality, and lower levels of rural infrastructure and economic activities. When combined, these factors severely limit the development of the area as well as the availability of livelihood improvements for the households. One of the main variables influencing the current crisis in Ethiopia is not just variable weather patterns but also there are other factors such as land degradation, rapid population growth, soil fertility, and more recently elements of governance and poverty influence vulnerability (Way, 2006; Brooks *et al.*, 2005; Taddese, 2001). The above discussion indicated that understanding the processes of vulnerability could not be achieved by a single approach. In an overview of the concept of vulnerability, the analysis needs to have large variables and diversity of approaches not only related to the socio-economic and institutional issues which well determine vulnerability but also resources availability and the entitlement of individuals and groups (Eakin & Luers, 2006; Kelly & Adger, 2000).

8.2 Traditional coping and adaptive strategies

The various traditional adaptive strategies and coping practices employed by the Konso communities have been presented in this study. Considering these results, adaptive farming strategies have evolved under conditions of resource scarcity and risk. These have enabled them to adaptively use the extremely scarce resources within an environment that is characterized by uncertainties. Examples of these include soil and moisture retaining and water diversion mechanisms; the use of crop varieties that mature quickly under rain-fed dry conditions; or matching crops with particular characteristics of soil properties within a plot. Other examples include crop-soil management practices, including: intercropping, crop rotation, applying cattle (and/or small

ruminants) manure, protecting and growing tress on farms, and live fences. Based on the study results, farmers in the area use various criteria to select and manage crops. This involves an assessment of the benefits and consequences of planting a particular crop (i.e. potential risks and benefits). Switching to different varieties of sorghum and millet or introducing new crops that that require less rainfall are example of this. Haricot bean has been introduced, and in 1988/89 three other varieties of sorghum were also introduced. The sorghum varieties, however, failed to perform in the area and disappeared from the field.

As such, when considering this trial-and-error method, the farmers' selection of crop varieties is a continuous process which incorporates different criteria such as tolerance to drought, or resistance to pest at storage. Farmers used to carry out dry sowing of sorghum in January. Now they are sowing in February; and, at times, in early March. The results indicated that the local farmers were predominantly motivated to employ a wide variety of land management practices due to a desire to meet multiple objectives and concerns; i.e. risk associated with rain, land heterogeneity, availability of labour, and/or lack of access to markets for different agricultural products. As such, the locals' approach to land management has been strongly influenced by a long-term experience of employing various mechanisms (both including, and in addition to, crop related activities) when adapting to extreme environmental and socio-economic pressures. This phenomenon is discussed in detail below.

Considering the research results, the first mechanism towards mitigating the shocks is a reduction strategy by which a household starts smoothing consumption. This is a standard practice applied by the majority of the households. This is typically followed by borrowing grain, and the sale of fuelwood, livestock, and/or other assets. Productive strategies, such as relief food, seasonal migration, and non-farm labour, are also used. The research results suggest that women are generally paid less than men, and, most often, payment is only given in kind. These findings indicate the status of women's contribution to household income. This being said, however, it appears women have no bargaining power on wages, and, as such, their contribution is somewhat limited by the labour market itself. In addition, since non-farm employment is typically a complementary means for reducing the vulnerability of the poor and/or land-constrained households (with farm income being the principle means), labour market opportunities for non-

farm employment tend to be less available, with employment often being temporary in nature with low wages. In the study area, there appeared to be no substantial evidence regarding the use of non-farm or off-farm income for investment and accumulation by the poor community members.

The migration phenomenon in Konso has a long history, and it has been an essential component of their livelihood strategies. As part of the overall household strategy, seasonal migration is undertaken by Konso farmers in order to diversify income sources, supplement household income, reduce risks, and/or to save or pay off losses from crop and livestock income. Many of the communities migrate in the slack season to neighboring districts. This is often synchronized very well between the origin and destination areas in terms of cultivation, sawing, harvesting and demand of labour for non farming activities. When migrating, social relations and information of destination are of extreme importance to the farmers.

Based on the research results, it was observed that young and adult men participate in seasonal migration. The majority of individuals migrate for daily labour work, but a few are also involved in searching out prospective areas for gold. As a livelihood strategy, seasonal migration appears to be important in terms of income. Households reported that returns from seasonal migration, on average, accounted for a third of the total household income. Thus, migration forms an important coping strategy for the poor. In general, farmers acknowledge that seasonal migration has contributed to the overall livelihood and food security of households. As most work as wage labourers, the cash earned is used to supplement household cash needs. Some have also used the income for investment, which, in turn, enhances their adaptive capacities.

While the benefits to seasonal migration were apparent in the findings, the farmers also indicated that seasonal migration may have a negative impact on labour availability for farming and land management activities, and, at times, has an impact on credit and decision making power during their absence. The farmers pointed out that the economic benefit of seasonal migration depends on the opportunity cost of migration and the amount of income the migrant earns at the destination. Although it is often the poor who migrate, the opportunity cost is high to them but is better than staying in their area. This has an important implication with regard to vulnerability; particularly in

Konso, where natural calamity and a lack of sufficient means of subsistence exists.

Considering the above, it is seen to be necessary that policies should recognize seasonal migration, non-farm and off-farm employment as important components - and regular part of - livelihood strategies, since these activities are often carried out in marginal areas with repeated shocks and stresses. One aspect that is of central importance for polices is the direct link between development, conservation, and seasonal migration. In addition, there is a need to better understand how seasonal migration and development affect one another. This is particularly important in isolated and resource poor areas, as, in addition to the regular farming practices being undertaken, many of the PSNP and credit scheme beneficiaries are also simultaneously involved in seasonal migration. As such, development agencies need to tailor seasonal migration and create or enhance self-employment in villages in order to avoid some of the negative impacts of seasonal migration on resource conservation and other activities.

These findings illustrate the importance of indigenous land management, in which farmers in a dryland part of Ethiopia cope with environmental and socio-economic pressures. The different internally conceived adaptive practices that have been presented reflect how the Konso people manage the scarce resources that are available to them, and the value they placed on the land and other natural resources. The relevant lessons from these findings demonstrate the ways in which farmers make decisions towards crop and land management in order to ensure food security to their households. What we observe today, however, is that these effective adaptive and coping strategies - that have been continuously developed and applied by these communities over many years - are becoming inadequate in providing them with full protection against repeated drought. In addition, changes to the social, economic, cultural, and political contexts add further complications to their situation.

As reflected in this study, exploring the dynamic land management and landuse practices that are being employed in Konso in order to adapt and cope with uncertainties need to be recognized and better understood. As pointed out by Smit & Wandel (2006) that adaptation, whether analyzed for purpose of assessment or practice, is intimately associated with the concepts of vulnerability and adaptive capacity. Developing a better understanding of

this indigenous knowledge and practice is an important factor. Nyong *et al* (2007) and Nuijten (1992) underlined on the importance and growing interest and the incorporation of local knowledge and traditions to provide environmentally sound approaches to development. From this enhanced understanding, development agencies could better decide how they could best capitalize on these unique attributes, and how to incorporate them with innovative technologies that more appropriately consider the changing socio-economic circumstances. To elaborate, development interventions and policy making must consider and carefully realize such practices and values that provide important lessons which can be incorporated with scientific knowledge both to understand and address the problems instead of writing off the value. By taking advantage of the existing opportunities that are available and by using the indigenous skills already present in the area, there is a higher likelihood of searching for and/or establishing potentially viable and sustainable livelihood solutions. Such an approach is needed in order to address the challenges of Konso people in particular and of livelihood issues in dryland areas, in general.

In recognition of the critical situation facing the area, and in light of the above discussion, various development initiatives have been undertaken to reduce vulnerability and improve livelihoods. In principle, the approach recognizes that active participation (from both the community and institutions) in the planning, implementation, and the evaluation of local development programs is a key in ensuring local livelihood sustainability. The extents to which these efforts have impacted the situation, as well as the constraints that frame policy/intervention implementation, are discussed in the next section. The purpose of this discussion is to learn from these constraints and to potentially contribute to improved future performance.

8.3 Impact of development interventions in reducing vulnerability

As part of rural development program, a number of interventions have been implemented in the study area; mostly by government agencies. Indeed, the communities are seeing improvements on basic social services and facilities. The on-going infrastructure development of roads, power and telecommunication benefits the local population in the *Woreda*. PSNP and rural credit schemes are among the major interventions in the area. The PSNP sponsored public works program has allowed communities to undertake public works in the area of restoration and rehabilitation of

natural resources. These projects include: soil and water conservation, water harvesting, reforestation, rehabilitation of degraded land through area closure, rural road construction, water supply schemes, etc. These activities are all aimed at contributing to natural resource management and food security – either directly or indirectly - by improving agriculture. The program also provides assistance to labor-constrained households, for example elderly or disabled individuals, who have been identified by the community as being food insecure. Evidence from this study suggests a slower actual environmental improvement, social and economic impact when compared with the target of the program. In general, the implementing agencies and the beneficiaries are well aware of the low quality and limited impacts of some of the public works.

PSNP has three objectives, namely bridging the food gap deficit, protecting assets, and building assets. From a short-term point of view, results from the first two objectives have shown a positive impact, regardless of their long-term sustainability. However, taking into account the severity of the problem in the area, the third objective has not yet been attained. As can be witnessed among the respondents, despite the positive efforts made, food aid is not overcoming the impact of the cycle of drought. Although some progress had been made, the position of food security has not shown improvement in a long-term perspective, for example, in alleviating chronic food insecurity, and its objective remains far from being achieved.

One piece of evidence is that people have not been able to recover from shocks. Instead, the number of needy people is rising from time to time. During the 2007/08 drought, out of the 48 in the *Woreda*, 45 of them were affected, and 123, 676 people needed assistance. In 2008/09 drought 37 *Kebeles,* about 103, 632 were affected. This figure did not include PSNP participants.. As such, it has been observed that a single year of drought can wipe out much of the positive efforts. This is an indication of the difficulty of achieving the objective of PSNP with regard to asset building and sustainability. Farmers cannot build assets with only PSNP. Even though the government claims that PSNP has been successful in some other areas, the prospect for substantial graduation from the program - and to attain the status that they no longer need a safety-net - looks a long way away. Thus, when considering the results of PSNP, it has not been as successful as expected in bringing viable sources of livelihoods that are needed to overcome drought.

Rural non-farm investments through credit programs are also implemented in the study area in order to improve livelihoods and stimulate rural employment. The newly started income diversification credit program by World bank Food Security Program has introduced small businesses, farm-related trading, and other activities. For many of the *Kebeles* and households, this alternative mechanism is not adequately in place. In this regard Slater *et al.* (2006) suggested that combining PSNP and other food security programs has potential to enhance livelihood significantly.

During the group discussion, the farmers indicated that they are more interested, and considered the loan to be more beneficial, when it was combined with safety-net. Some even suggested the possibility of raising the amount of loan or diverting some of the PSNP budget. These actions would contribute to a reduced dependence on aid, and were suggested by the farmers for two main reasons: (i) so that the community feels less dependent on the World Bank project (due to its nature and objectives), and (ii) because they consider the grant belonged to the community, and, therefore, they should be entitled to utilize the money as long as they repay the loan. Some of the constraints mentioned by respondents with regard to not taking part in the loan scheme were: fear of loan failure, lack of confidence and reluctance to take the risk, and/or the lack of a supportive environment to maximize the benefit of the loan e.g. fodder, access to veterinary services, markets. As an example, in the study area takes up to six months compared to other places where it took three months. This can due to the reasons mentioned above or because of situations where by a borrower buys weak ox then use the rest of the loan for other purposes in order to spread risk. This means longer time is needed between loans being received, profits and repayment being made. Sometimes beneficiaries involve themselves in a risky business out of their project formulated at time of loan agreement. In line with this Reardon *et al.* (2007), Doocy *et al.*(2005) and Ezra (2001) pointed out that supplementary sources of income became necessary. Lack of widespread access to financial savings and credit, lack of investment in rural infrastructure, shortage of investment and sectoral growth and growth of rural towns are key constraints particularly in low-return, high-risk livelihood strategies (Barrett *et al.*, 2001; Reardon *et al.*, 2001).
Rural development is often a cross-cutting issue rather than a separate category of activities. Food security is not a single activity and it cannot be achieved by a single policy solution. It is often linked to a wider range of

sectoral approaches, which require concerted effort, and should be addressed from a long-term sustainability perspective. However, often there is a lack of coordination and integration among the different sectors. This is true even within the closely related food security programs (e.g. the World Bank Food Security Program and PSNP have not been working in a coordinated fashion). The complex biophysical and socio-economic situation of the area requires that the different development agencies collaborate and strengthen the broader *Woreda* development strategies if they are to achieve the necessary level of synergy and produce the desired objectives of their programs.

The public works use a watershed approach and, in principle, employ a participatory framework. PSNP is a large program that focuses on the restoration of public assets and ensuring participation would be difficult. Any weaknesses in practice in participation in large projects could undermine sustainability of the program. The local-level context of the situation needs to be critically considered when focusing on the expectation of individuals to graduate from PSNP; rather than the objectives and decisions being made solely at higher levels. Thus, the study area may demand continued commitment and support - both material and technical – in order to achieve food security.

Despite the problems, the farming sector remains the major source of income in the study area, and improving the farming sector with respect handling adverse environmental effects is imperative ensuring food security. This has not been the case historically, as the scope for enhancing farming practice in the area has been neglected by the interventions. This study does not seek to claim that technological and scientific solutions are the only way out. Rather, the bleak situation can be changed by appropriate agricultural technological interventions that combine both traditional and current knowledge. The linkages between food security interventions, other rural development activities, and people's adaptive and coping practices should be incorporated together. Interventions need to support the communities in order to improve their capacity in managing their livelihood resources, promoting better public services, and enhancing economic opportunities that reduce their vulnerability. This study suggests that, in order to effectively integrate vulnerability issues with development interventions, a better understanding of the context in which peoples' livelihoods operate needs to be of primary focus. This can be achieved by engaging the

community in the planning process, and support policies should adequately consider the context in which they are being applied (i.e. the environmental situation, socio-economic conditions, and location).

8.4 The role of trees as adaptive strategies

Under the PSNP scheme, tree growing has been undertaken to reduce the impact of adverse environmental conditions. PSNP work focuses predominantly on public land, and the community is positive to these efforts (e.g. reforestation). Due to the poor quality of the growing sites and lack of moisture, however, the survival rate of tree seedlings has been so low that growing has to be done repeatedly year after year on the same site. Parallel to this, the technicians suggested that PSNP needs to be flexible on some activities, such as tree growing on private properties, by providing them seedlings of high value trees that showed promising performance under the local environmental conditions. When trees are grown closer to farms and homesteads they get the attention and care that helps to improve their survival. The following discussion focuses on tree growing initiatives by farmers on their private land, either with or without PSNP assistance.

This study showed that, the majority of the farmers in the study area are very interested in the future expansion of tree growing, as it could help provide them with multiple products; in particular, construction wood, fodder, and fruits. Despite the farmers' interest in tree growing, the study identified a wide range of factors influencing a household's decisions to grow trees. Some of these factors included: size of land holding, household income or economic conditions, existing socio-economic and environmental context, and a lack of preferred tree seedlings. The results showed that more trees are apparent on large but less productive landholdings, as well as holdings with small but numerous plots. One of the most significant constraints to tree growing elsewhere in Ethiopia – i.e. land tenure insecurity - was not an important factor in the studied communities. Due to the recent rumor of land certification in the study area, however, the farmers are now showing signs of decreased interest in crop land conservation and tree growing. This phenomenon is a result of fear of confiscation of extra land.

It should be noted here that farmers of the study area frequently pointed out that it would be difficult to achieve successful tree growing plans without ensuring that household food security requirement is met. Therefore, any tree expansion activity has to be based on a clear identification of the

potential constraints. Although the role of trese in the area is often limited to subsistence use, which, under the circumstances is understood, there is a need to enhance the role of trees as one of direct means of cash income. The respondents stated that shrinking forest resources, increasing population, urbanization, and the rising demand for construction wood and fruit in the surrounding areas, create incentives for farm tree growing. As such, tree growing could serve as a way to create income generation opportunities, reduce vulnerability risk, and contribute to food security.

Because sources of subsistence are limited in the study area, there are few opportunities for generating cash income within the existing livelihood systems. The demand for fruit trees is quite high, however, introducing or increasing fruit tree growing may be more difficult than growing tree for construction, fuel or fodder. Fruit trees require more care, and the success of a fruit tree growing strategy will also depend on the availability and supply of good stock of seedlings, available labour, and proximity to markets. Moreover, fruits are perishable, producing and marketing them in an infrastructure limited area reduces it overall attractiveness and sensitive to price fluctuations (Bellow *et al.*, 2008; Snelder *et al.*, 2007). The success of fruit trees in the study area will depend, to a large extent, on addressing these constraints. Even though Konso is located in a marginal area, farmers see the surrounding *Woredas* as being a good potential market for construction wood and fruits. They are optimistic and feel that market is not a constraint for construction wood and fruit specifically mango.

In an agroforestry system, the incorporation of a diverse range of tree species with different values, and a good adaptation to harsh environmental conditions, can contribute to ecosystem services and the diversification of sources of incomes. The major production functions of agroforestry include, wood for household construction and fuelwood or generate cash income, supply fodder for livestock and fruits for human consumption (Jama *et al.*, 2006; Leakey *et al.*, 2005; Gebrehiwot, 2004; Simons & Leakey, 2004; Bishaw *et al.*, 2003). Some of the ecological functions include soil fertility maintenance and erosion control, and watershed protection. In the study area, trees have always played a key role with regard to people's adaptive strategies (i.e. for both economic and environmental reasons). In addition, it noteworthy to mention that the farmers' indigenous knowledge of tree growing and maintenance (of a broad diversity of tree and shrub species)

provides evidence of their expertise in traditional agroforestry systems, as well as the benefits they have attained from applying these systems.

More importantly, it is not merely the presence of trees on farms that automatically equates to tangible benefits. Rather, success requires careful selection of species, with a detailed design and plan in mind that focuses on intensive management of the trees and crops in order to raise productivity and yield. This being said, in order to attain higher productivity, there is also a need to improve traditional agroforestry practices through the identification of new niches, while also maintaining a balance between traditional knowledge with the improved system. These efforts can be seen as a way of enhancing the adaptive capacity of the farmers in terms of both farm production and income. A more holistic approach is needed that recognizes the farmers' multiple objectives, and balances tree growing interventions with other alternatives.

The promotion of agroforestry could also be tailored to be congruent with other development intervention programs which aim to address food security and income generation issues. Some example would be linking livestock fattening and goat rearing with fodder tree growing; coupling fruit trees with water harvesting techniques or fruit marketing; and incorporating areas with community tree growing on public lands with, for example, beekeeping, so that each technology can complement the other.

8.5 Enhancing the capacities and mobilizing informal institutions

Konso is good evidence of how human inventiveness and skill can be applied to manage and survive in a difficult environment. Historically, the Konso people have been employing various types of land management practices to survive in a difficult area. The terraces and other environmental management practices have been used and maintained by the current generation for over four hundred years with much hard work and determination. The exceptional agricultural and land management system, as well as the institutions in place in the area, are the key factors for survival during stress periods particularly, when the area has limited and poor resources. Considering the importance of these locally-specific factors, and the institutions that have been established within this context, the protection (and assurance of the continued existence) of sacred forests, as well as the growth of multipurpose indigenous trees in crop fields and around

homesteads, are key components in providing Konso's livelihood needs and to promote biodiversity conservation. In addition, issues such as conflict management, resource protection, the regulation and supervision of access to resources, and other day to day social roles, reflect the importance of promoting the role of informal institutions. The key drivers behind all these efforts are context-specific; i.e. isolation, remoteness, inherent poor soil fertility, rugged terrain, erratic rainfall, and other socio-economic and demographic pressure in the area. As such, the importance of local knowledge and know-how in tackling livelihood vulnerability issues cannot be understated. Institutional partnerships are crucial to local adaptation practices. Support for such partnerships can greatly enhance informal institutional processes through which adaptation occurs (Agrawal, 2008). Formal and Informal institutions interact in four ways: complementary, accommodating, competing, and substitutive (Helmke & Levitsky, 2004). In Konso situation I suggest that following the two typologies, establishing relationship could be useful in development programs rather than marginalizing the informal institutions.

To elaborate, all of these factors stand in support of the need for a more comprehensive understanding of the wide range of institutions and how they work in order to cope with socio-economic and environmental changes. An emphasis of the institutional elements and organization (i.e. with consideration of aspects such as norms, values and cultural aspects) could also be helpful in understanding rural dynamics, actions and their context. The informal institutions contribute to the creation of a favorable ground with respect to the economic and social development efforts being undertaken in the area. For example, the Konso people sustained their livelihood system through their indigenous institutions *Xelta* and *Timpa* as the highest decision making bodies with regard to natural resource management, conflict resolution and other socio-economic issues. These should be considered in development interventions in the area. Parka or Alumela could be one of the potential candidates that could be integrated. However, collaboration and integration of informal institutions is limited. As such, an enabling environment for the creation of opportunities which enable the communities to actively contribute and influence development is needed.
An understanding of the participatory development approach must be grounded in the social-cultural institutions, and needs to be developed with an accurate conceptualization of the difference between passive participation and empowerment. It must also be ensured that the objectives for sustainability, development, and natural resource management, also target an

active role of the communities and their institutions. Development agencies need to strengthen the capacity of informal institutions and take advantage of the rich experience that these people have. This is important in the planning and implementation of external interventions, and serves to strengthen their adaptive capacity. The way to reach an explicit and effective involvement of the informal institutions and the communities is to ensure participatory development, as well as by institutionalizing this participatory approach. Under these conditions, communities could be empowered to make their own decisions; and be better suited to respond to their realities.

8.6 Relating to the theoretical approach

8.6.1 The Sustainable Livelihood Approach

The sustainable livelihood approach was used as organizing and guiding concept in this study. The SLA is increasingly used by many development agencies and nongovernmental organizations (NGOs) to achieve a better understanding of natural resources management systems (Allison & Horemans, 2006). In the SLA, the focus of analysis is households or individuals with diverse livelihoods resources and outcomes as key features. Livelihoods security is seen as the outcome of processes taking place within the household for which resources are used (Niehof, 2004). The strength of the approach is that it recognizes the complex range of assets/ vulnerability to analysis of the livelihoods (Norton & Foster, 2001). Resources are dynamic that they can be combined, used or transformed to construct livelihoods. The resources play wide number of roles in the livelihood strategies essential to livelihoods. Understanding how the combination of resources natural, economic, social and cultural importance and how values are attributed to these resources is essential for understanding rural livelihoods. The ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible resources that people have in their possession and it relates to wide set of issues (Scoones, 1998).

The SLF presented in this study had identified the diverse resources that contribute to peoples' livelihoods. The framework here had not been used as such to measure each of the resources and performance needed to achieve a sustainable livelihood. Instead it was used to identify the diverse resources, interrelationships and importance in contributing to peoples' livelihood strategies. The approach showed that household livelihood strategies were cross-sectoral and diverse among the studied people. The SLF has enabled

the identification of the critical factors in the biophysical and socio-economic environments that influence household livelihood decisions, represented by the different livelihood portfolios. A focus on food security within a livelihood context was also emphasized in the study. Moreover, the approach helped to prioritize intervention needs of the area on which livelihoods support is needed. It has also revealed the close links and influence of formal and informal institutions on livelihoods resources and outcomes. Combining the SLF with PRA tools facilitated an intensive discussion with community members of the study area.

Swift & Hamilton (2001) underlined that the sustainable livelihood framework sought to improve a researcher's understanding of how people use the resources at their disposal to construct a livelihood. Even if various types of resources are available this does not mean that people have access to and use the resources in equal basis and the same way. Bebbington (1999) argues that livelihoods should not only about understanding how people are making a living but also should encompass the ways in which people are able to expand their asset bases through engaging with other actors as well as relationships governing the ways in which resources are controlled. The concept of livelihood thus concerns both the resources available to people and the way in which decisions are made to access and use them. The policy and institutional aspect of the SLF plays a key role in addressing such issues. Likewise, development interventions should be examined with the broad context of power relations. This raises the issue of human agency in development interventions. In light of this, the study highlighted that rural development interventions should be viewed through the lens of agency and structure relation.

8.6.2 The agency and structure lens applied

In light of the conceptual framework mentioned in Chapter 2, this thesis has also incorporated the perspectives of agency and structure. This approach was taken with the view that it could serve as a potentially useful conceptual framework for transforming socio-economic and institutional structures. The key point for this thesis is that livelihoods are a function of assets, institutions and structures. And, as such, there needs to be due recognition (and investigation) of the function of agency and structure in relation to the research findings (along the themes of the livelihood, adaptive strategies, interventions, participation and policy/structural issues). As the ability to adapt and cope depends on economic, social and institutional factors,

McLaughlin & Dietz (2008) and Turner *et al.* (2003) have suggested that a comprehensive understanding of vulnerability must be capable of addressing the interrelated dynamics of the socio-political structure, human agency, and the environmental/physical processes which operate at various scales.

With this as background, this section describes how the interrelated notions of agency and structure can be better related and understood. This is achieved in a concrete manner, through a focus on several key findings of the study. The study suggests the need for improved recognition of the linkages between development interventions and community adaptive practices. The adaptive capacity of a local community is a product of the economic, social (both formal and informal), and political context in which it operates. In many respects, local actors shape and influence these relations; and, hence, the recognition of agency and structure becomes evident. Good governance, resources and the nature of institutional structures in decision-making are important elements and a driving force for adaptive capacity (Vincent, 2007; Yohe & Tol, 2002). Alternative and appropriate policy and technologies can reinforce local adaptive strategies. This, in turn, can lead to sustainable livelihoods and reduce community vulnerability to drought and future threats to food insecurity. In this regard, a utilization of the local people's well developed knowledge of the study area (i.e. regarding the interaction with their environment, vulnerability and adaptive practices) can serve as an enabling force of vital importance. This study proposes that strengthening the individual's (and household's) agency enhances the aspiration of the communities for improved livelihoods. In line with this, when considering that agency can only be affected through institutional structures, the enhancement of formal/informal institutions, as well as the heightening of community ownership and leadership in participatory development interventions can also promote people's capacity to bring about change and to be better suited to respond to changing circumstances.

When applying the agency and structure approach in interventions and development programs, the study highlights the need for an increased focus and commitment on participation and power in order to allow individuals and households to exercise their agency. This will enable households and communities to make choices about their livelihood in order to decide and act. In this regard, Hickey & Mohan (2005), Shortall (2004), and Cleaver (1999) stated that the underlying concepts for participatory approaches to contemporary development should be subject to greater critical analysis, and would add considerably to our knowledge of how agency and structure

function. Despite the claims of the implementing agencies regarding the participation of people in the intervention process in the study area, the communities have not yet had the power to exercise their agency and exert a clearer impact on the intervention and there by reduce their vulnerability. Their agency needs to be facilitated through structural improvement, so that individual agents develop and carry out their strategies. An understanding of the context is helpful in designing of development interventions and this can only be achieved by an informed agency. Given the current state of interventions programs in Konso, emphasis should be given to agency and structure relationships in order to enhance their outcome.

Non-agricultural income activities can also play an important role in contributing to food security. The provision of sufficient financial access, skill, infrastructure and better technologies that are affordable to the communities are needed to improve their productivity if they are to continue to survive in this marginal crop growing land. Policies should at least aim at creating income and elevating self employment opportunities (i.e. by strengthening the institutional requirements that are responsible for such interventions). As such, local government institutions and community organizations need to play a central role in agriculture/non-agricultural activities, and rural development initiatives. Specific factors such as infrastructure, market development, a suitable credit system, capacity building for the poor, as well as other institutional components, play a significant role in positively affecting the livelihoods of the people. Rural planners should not see rural policy as a choice between agricultural or non-agricultural investment; i.e. between an agricultural-led development strategy, on one hand, and a non-agricultural approach, on the other (Start, 2001). The two sectors feed from each other. The balance of investment will be determined by the type of rural area and its stage of development (Start, 2001).

The importance of seasonal migration as an important survival mechanism - and its impact on social transformation in the area should also be recognized. This phenomenon has been crucial for the poor farmers to be able to carry out their land conservation and farming practices as desired. Based on the study results, most households in the study area rely largely on their active labour for farming, although most migrate during the off season of cropping. This result shows that migration has prevented households from appropriate conservation of their farm, and may also be affecting the likelihood of development interventions. This is an area which the promotion of the

ongoing income generation, self employment and PSNP programs should pay close attention to the pattern and nature of seasonal migration, and other non-farm and off farm employment activities and their impacts on development interventions as they are often done outside cropping seasons. This will ensure more engagement and participation in the development activities in the area.

The study also investigated the role of trees, and the determinants of tree growing, in Konso's social, environmental and economic context. Based on the discussions and interviews conducted, the communities believe that existing and expanding markets in surrounding area (i.e. outside the study area) will provide an incentive for the future expansion of tree planting. As such, organizations involved in conservation and afforestation programs should consider the production and extension services of preferred, high value tree seedling stock as part of their intervention schemes. In addition, the government should take a more significant role not only with respect to the production of the would-be needed tree seedlings, but also with regard to the institutional support for tree planting (such as land tenure issues, which is not the case in the study area), the availability of credit and markets, income enhancement, crop productivity improvements, and technical skills.

It has become evident that the current decentralization of administrative power to the Woreda level, and Konso attaining the status of 'special Woreda', has been an advantage. Konso should take full advantage of this special consideration and opportunity for its development. In addition, the ongoing infrastructural improvements to education, health, roads, electricity, and telecommunication networks have been achieved as a result of removal of the structural barriers and by generation of a favorable climate for establishing improved livelihoods and socio-economic development in the Woreda. This is most likely to promote positive changes in the economic and social development of Konso.

Examination of agency-structure relations in cooperation with development interventions and the place of local institutions reveals the interdependent nature of the two aspects in Konso. Both structure and agency always must play a role in social research, however, in some cases most weight is given on structure and in other cases on agency, depending on the problem at hand (Vatn, 2005). In Konso situation both agency and structure should apply together as agency reveal individuals' action and efforts while the

structure ensures that different interest groups and partners are represented and serves as means through which this action is made possible.

8.7 Governance and policy implications

Ethiopia has developed Food Security Strategies with the aims of improving the food security of a large segment of the vulnerable population. The Sustainable Development and Poverty Reduction Program-SDPRP (2002/03-2004/05) and the on-going Plan for Accelerated and Sustained Development to End Poverty-PASDEP (2005/06-2009/10), has been the major strategies.

The adopted strategies rely on the three aspects of increasing the availability of food namely through domestic production, ensuring access to food for deficit households, and strengthening emergency response capabilities of relevant institutions (PASDEP, 2006). PASDED has two underlying principles: a reliance on helping farmers to use their own resources to overcome food insecurity, both through agricultural improvements and diversification of non-farm income sources, and a shift away from reliance on foreign food aid. The government has implemented activities that are meant to boost agricultural production in order to achieve self-sufficiency. The government promotes best practices and distributes fertilizer and improved varieties to farmers. Expansion of investments in health, education and infrastructure facilities to rural areas as supportive mechanism are emphasized in rural development strategy. Building new roads, clinics and primary schools, and range of agricultural initiatives are showing encouraging results.

The recent growth in the agriculture sector is a response to the strategy that has been under implementation since 1994. The volume of total production of major crops by private peasant holdings during the main season increased from nearly 134 million quintals in 2005/06 to 149 million quintals in 2006/07. This amounts to a 12% increase over the production level in 2005/06 . Despite the efforts made to improve agriculture and growth, the country's food production is not yet in a position to impact food security. With the growth rate of production being below that of the population, and the growth rate of availability barely keeping up with the population, it seems that Ethiopia is suffering from chronic food insecurity. The food

insecurity is likely to persist in Ethiopia for the foreseeable future (Nichola, 2006).

Like wise, the efforts to address food security remain the greatest concern in the study area. The number of people that are food insecure and vulnerable has not been declining, implying that the development interventions could not overcome and the situation is still persistent. Intensification and diversification strategies are crucial for Konso situation. Diversification in the context of the study area should be seen as a link to agricultural development and both of them should be well integrated and should complement each other. Improving land productivity will pave the way for improved non-agricultural occupation opportunity. Perhaps one of the biggest challenges is the neglect and the need to overcome skepticism of the viability and contribution of the farming sector in the area. Improving the sector will not be easy. However, farming as the dominant livelihood activity, remains important in terms of food security for the majority of Konso people.

Improving agricultural productivity through improved technologies in crop varieties and better management practices suitable for dryland agro-ecologies that have the ability to respond to natural risks and sustain crop production are very necessary. In the process, jointly identifying and analyzing practices, problems and priorities, providing adequate space to encourage indigenous practices and developing and building on these practices further with contemporary technologies would be helpful. Management practices, pest and disease that reduce yield losses should be introduced. The increased population pressure, fragmentation of land and declining soil fertility should be addressed.

The other key point over recurrent drought and vulnerability in the study area is lack of understanding of the capacity of individuals, households, social and the economic context to mitigate and recover from impacts of drought. A household's asset in its various forms and at disposal is of central importance to the livelihood of the people. A household's capabilities, assets and activities enable households to secure basic needs - food, shelter, health, education, and others. Therefore, understanding the magnitude and dynamics of the tangible and non tangible assets and the contribution of each of the activities to a household's livelihoods and how these are influenced by external factors provides insights on the types of interventions needed to prevent or absorb shocks. Therefore, in depth understanding of what

capacity they have in responding to drought is useful entry point in development intervention by identifying barriers and driver of change.

Farmers grow trees on their land according to their needs and available resources base. The decision by farmers to grow trees is influenced by various factors and involves adjustments of the resources. This implies that an understanding of ways in which farmers operate, respond to changes and adapt to their broader livelihoods strategies is essential. This means that tree growing on private farm lands should match with, and support farmers' livelihoods strategies and actions. Although farmers' in the study area have generally showed strong interest to grow trees that have a market value as well as meet their household needs, increased market access and other support service constitute the necessary conditions in particular with growing of fruit trees. The development of agroforestry at the household level has a potential not only to supplement households for fodder or fuelwood needs but also to meet household's cash needs. Development interventions that improve food crop production and household income, markets and supply of preferred tree seedlings including high value fruit trees were identified as important motivation for expanding future tree growing. Tree growing designed to support conservation as in public or common land has also to extend its support to private land. It is important that there should be a balanced approach to public and private tree planting and this should be seen in the wider context of tree resource management for the whole area.

Tree growing on farms needs more attention from policy makers, planners and development agencies. Although the development agencies claim to have built their programs and activities based on farmers' problems and needs, it needs to be done in genuine, active and in a much expanded way to reflect farmers' problems and diverse needs. The development agencies should design their interventions together with farmers to figure out potential incentives to achieve tree growing goals, through greater understanding of the overall economic goal and household strategies and broader environment and socio-economic context and patterns of livelihood strategies and farmers' perspectives. Farm tree growing interventions with the objective of improving smallholders farming and adaptive strategy are more likely to stimulate tree growing and succeed if they are based on an appropriate policy environment and conditions that eliminate the constraints to tree growing and provide appropriate incentives.

8.8 Final remarks

The study proposes that adaptive and coping strategies can be viewed as an outcome of interplay with agency and structure. For example, each of the strategies is based on local knowledge, individual experiences, cultural choices and social interactions. Therefore, individual and collective agency and social relations, institutions and power relations play central role in shaping adaptive and coping strategies. The adaptive and coping strategies as they are practiced locally vary from individual to individual and influenced by social relations and structure in different settings. The main advantage of agency and structure approach is that it is concerned about unlocking structures that constrain or enable the agency of actors to respond to their vulnerabilities. Therefore, what emerges from this study would be to underline that comprehensive adaptive and coping strategy and interventions implemented to enhance adaptive capacity would be better explained by the agency and structure approach.

The current interventions and investment by government to provide social protection and promote community development in the study area are showing signs of development achievements. Interventions often come in the form either a top-down or bottom up approach. However, a more dynamic and a two-way approach to understanding social transformation is therefore, needed to stress the interplay of endogenous and exogenous factors and the role played by human action and structural circumstances. It is important to focus interventions that they should be deeply negotiated between individuals and groups to identify differing interest rather than simply presenting and executing a specified plan of action. In such away that development initiatives can become more process-oriented.

Within the literature on rural development, the inclusions of formal and informal institutions has been viewed as a key determinant of development outcomes. Livelihood practices, strategies and opportunities are shaped within the context of various and varying sets of formal and informal institutions. Rather than concentrate solely on the ways in which formal institutions and organizations shape livelihood and socio-economic outcomes, a development-orientated institutional perspective also needs to emphasize more explicitly on the role of informal institutions.

The issue about the primacy between agency and structure on human activities, thought and behaviour has been one of the central issues in sociology, political science, and generally in social sciences. The most

notable aspect is Gidden's approach that reconciles the debate by stating the interdependence of agency and structure which are conceptually distinct but inseparable and thoroughly intertwined. Giddens (1984) stated that the constitution of both individual agents and collective structures as equally constitutive elements producing a condition of duality of agency and structure. Under such condition, human agents create and reproduce social structures, while a socially structured environment shapes human agents. Bourdieu (1977) provided as an alternative explanation and sought to reconcile the influences of both external social structures and subjective experience on the individual. From this perspective, therefore, conceptualizing agency and structure oriented approaches in rural development interventions have vital implication in facilitating social transformation.

9 Conclusions

This study has assessed and identified a range of factors and conditions that make households and communities vulnerable to risks with drought being the primary issue in focus. Since drought unlike other natural disasters is it is a slow-onset, creeping phenomenon with wide-ranging economic, environmental and social consequences ((World Bank, 2006). Through this research inquiry, an attempt was made to examine the underlying causes of vulnerability in the context of environmental, socio-economic and institutional aspects at the local level. An emphasis was placed on household livelihood conditions mainly from the perspective of agricultural production, food security, household assets and livelihoods diversification. This approach is seen as being useful in addressing issues of vulnerability.

The study employed the SLF coupled with the agency and structure theory in order to establish more thorough insight into power relations within a society. The SLF provides a structured approach to better understand rural livelihoods. It provides an analytical framework which focuses on how assets can be considered to be a key aspect in examining a range of household livelihood strategies, while simultaneously facilitating a heightened exploration of the dynamics of environmental, social and economic processes that are involved in making a living. The framework also aids in providing a more appropriate analysis of the interactions between the various tangible and non-tangible assets in the society, while subsequently allowing for the enhanced development of a clear, context-specific view of the impacts of these interactions.

This study incorporated the perspective of viewing a household as having capacity for agency, with livelihoods being its emergent properties. This

approach was taken based on the view that development issues are strongly characterized and influenced by agency that is, agency and power are interrelated phenomena and are essential for transformation. Bearing these concepts in mind, this study attempted to integrate the livelihood approach with agency and structure. This approach was selected based on the assumption that it could help to extend the options for action of both individuals and households by enhancing the ability for them to exercise their agency in the processes of development.

The linkage between population growth, resource shortage and degradation and increased vulnerability has been well recognized by community members and local authorities in the study area. Based on the collected survey data, the average family size has been found to be 6.6 persons, and the age structure of the population shows that children under age group 14 accounted for about 50% of the total population. The age dependent group of the population accounted for 52.6% of the total. The total adult literacy rate was 46% for males and 25% for female with the overall literacy rate being 36%. The findings from the study site showed that school attendance for boys aged 7-14 was 36%, while girls' attendance in the same ages in primary schools was 16%. These results suggest that high illiteracy rates and lower educational levels are limiting people's capacity to be engaged in alternative livelihood options, thereby increasing their vulnerability to food insecurity.

With regard to landholding size, 34% of the respondents owned land holdings less than 0.5 hectare, whereas 33% owned between 0.5-1 hectares. Land holding is very much fragmented, and the rising population has resulted in shrinking and eroding land per capita. In the study area, livestock are kept for wealth accumulation rather than using them as a draft power or dairy production. About 60% and 54% of the sample households did not own ox or cow, respectively. The mean number of ox and cow reported was less than one (0.68 and 0.71) respectively. Livestock sharing is one of the major means for acquiring livestock in the study area, and 26% of the household obtained livestock through livestock sharing arrangements. Small ruminant production is a more important activity in Konso than cattle rearing. Shortage of grazing land and fodder were major constraints to livestock production. Regarding household labour division, the results showed that major farming tasks are, to some extent, more highly influenced by men; with an average involvement in these tasks of 58% for men, and

42% for women. With the exception of women not being involved in terrace construction, most farm activities- for example, ploughing, sowing, weeding and/or harvesting - are jointly undertaken by both sexes.

Most respondents and authorities agreed that demography has become a major challenge. If the growing population is left unchecked, it could potentially exacerbate the already scarce natural resources; particularly the farming land. When thinking about sustainable development in the area, addressing population pressure and enhancing the development of human resources are suggested as two key areas of focus. Despite the fact that Ethiopia has formulated population policies and programs, where family planning is a core component, the fertility rate in the rural areas remains high. The economic, social, political, education (especially for girls), skill development, employment and health status of women are all necessary conditions which require improvement in order to bring about a sustained decline in the fertility rate.

Since the mid-1940s, drought has hit Konso every 10-15 years. However, since the 1970s the time span has lessened, and in recent years, drought has become more and more common. Based on indications made by the respondents, there was a perception that the current trend appeared to be worsening with drought occurring at a frequency of almost every 3 years. The farmers also perceived that drought severity and frequency have been increasing in recent years; i.e. rainfall had become more erratic during the long rainy season, and had become less predictable over the past two decades. Farmers were also concerned about the increasing frequency of bad years. According to historical rainfall data, however, the findings showed that the amount of rain during the long rainy seasons, as well as the mean annual rainfall quantity, did not display any significant trend of decline (at least since 1987). The trend was, however, highly variable on a year-to-year basis.

The findings of the study showed that agriculture is the main occupation of the Konso people, and that drought has been an integral part of the recent history of Konso. The farming practices carried out by the people in the area have evolved over time, and are centered on conservation-based farming practices. Examples of such traditional farming practices are various types of soil conservation and water harvesting techniques (used to optimize soil moisture), plant biodiversity management, and the use of carefully selected

varieties of sorghum (for example 20 different varieties of sorghum in the area) according to soil type and moisture characteristics, as well as local needs. The local knowledge and experience of agricultural production has shown the ability of the community to address the key constraints of food security in a dryland ecological area. Their practices have helped them to become environmentally and socially resilient. However, during the past few decades these coping strategies have been found to be insufficient in dealing with the speed of environmental change (mainly with respect to drought), high population pressure, and other socio-economic factors.

At present, the people in Konso are chronically food insecure, as they hardly produce enough to meet their annual food requirements. The study discovered that the average actual/total crop harvest of sorghum yield for all samples declined by 55% in the past decade and a half (i.e. 1990-2004). However, in year 2005/06, which was considered to be a relatively better harvesting season, there was an increase in the yield by about 63% over and above the previous five years (i.e. 2000-2004). The major reasons for the decline in yield as stated by farmers included a decline in the amount and distribution of rainfall, continuous farming, soil fertility decline, pests, and diseases. The study has also identified that, even under good weather conditions, a third of the population cannot produce enough for its annual consumption. In the bad harvesting season, 75% of the population can cover only three months of household food requirements. This is due to a low output of agriculture and frequent crop failures experienced, and/or an inability to buy enough food as a result of eroding assets. The people have been tirelessly putting efforts towards adapting their livelihoods to cope with their situations, but they are finding it to be increasingly difficult to escape from the traps of food insecurity.

The farmers recognized drought as being more than merely a shortage of rainfall; rather, they saw and understood many other factors which were also contributing to their vulnerability to drought; such as over cultivation, soil types, rising population, scarcity of land, location and land management practices. The population in Konso grew from about 60,000 in the 1970s to 230,500 at present.

In its effort to address food insecurity, the Government of Ethiopia has been implementing a program, known as PSNP, through which there is an attempt to mobilize the necessary resources and meet the immediate food

requirements of those affected by drought, while also protecting the individuals' asset bases. The strategy also envisages the reduction of vulnerability to drought and food insecurity via a more comprehensive and multi-sectoral development strategy. However, when developing and implementing a drought management strategy, a successful policy intervention is dependent on government capacity, as well as the availability and reliability of resources for investment. So far, appropriate technologies and innovative approaches for Konso are far from reaching the users. Technological and investment options are limited, and the desired holistic approach to food security (in particular), and rural development (in general), remains a challenge at the local level.

Subsistence crop production is the primary means of household food production. Households allocate most of their land for food crop production. But the support being provided by the extension system by NGOs leaves much to be desired. Considering the local environment and farming systems, crops with better productivity advantage under low-cost and low-risk environment will be the ones to be promoted in such marginal areas. In fact, this needs to be the core adaptation strategy. Short and long-term options must be promoted. This requires a needs-targeted research with respect to crop production, and in the identification of cropping systems that best fit the local circumstances. Thus, policies and support mechanisms should promote investment in land improvement in order to help increase crop productivity.

It is believed that farming practices must also evolve and include the moisture-preserving cultivation method, water collection ponds, and improvements to available irrigation systems (where feasible). Since the local people have developed their own locally-specific natural resource management system, coping mechanisms, and ways to manage drought under harsh conditions, an emphasis must also be placed on the value of this knowledge. Drought intervention planning clearly needs to recognize such experience, and requires a local context to serve as the foundation for development strategies in order to maximize the chances for success. It must also be ensured that a true participatory dialogue between communities, individuals, informal institutions, PAs, and implementing agencies is achieved, as this is critical for interventions to succeed.

Off-farm and non-farm activities are becoming increasingly important in people's livelihoods, and are playing a stronger role in their strategies for dealing with livelihood insecurity. Based on the study findings, a number of off-farm and non-farm activities, as well as seasonal migration, appeared to be contributing (to different degrees) to livelihood security. An increase in the involvement of men and women in non-agricultural activities, most notably in paid labour work in and around the community, has been observed. To elaborate based on the research results, close to half of the male population of working age was engaged in daily labor, while female population involvement was about 18%. Seasonal migration involving a search for employment was also becoming increasingly common. Migration intensity varied from *Kebele* to *Kebele* (and even between villages), where the highest number was about 60-70% (in Mecheke), and the lowest number was about 22% (in Dera). The average migration rate for the entire study site was about 46%. It was also discovered that approximately a third of the household income in the study area was obtained from seasonal migration. A recent decentralization of administration, as well as improvements to the local infrastructure (i.e. roads and telephone networks), have facilitated a greater ability for information flow and seasonal migration. Based on the research findings, income earned during seasonal migration was often used to help meet subsistence requirements rather than being used for investment; though this depended on the availability of financial capital, social relations, and intra-household conditions.

Planned interventions should be examined against this background. Much of the development activities in the area - in particular the rehabilitation of degraded lands, the restoration of natural resources, and the development of public resources - have been implemented through PSNP. Over 74,000 people are already involved in the program. The communities indicated that the interventions on water, health and education - which indirectly contribute to food security and the well-being of people - are improving. The PSNP has enabled people to have better access to food, and has helped individuals to cover small expenses for medicine, school, and other needs; however, the resource was rarely used for productive investments or saving.

Considering the benefits individuals have gained, the government's shift from emergency and crisis operation to PSNP can be viewed as a good thing. PSNP aims at rehabilitating the natural environment, while also supporting households in the protection and building of assets. However, it

has been observed through this inquiry that the various physical conservation measures, specifically tree planting and natural resources management strategies that are implemented on communal areas, have registered limited success. This is mainly due to limited staff for the planning and implementation of massive public work programs, limited participation of the community in planning the interventions in such big program, the status of the resources being restored, and a lack of well defined responsibilities and benefits for the communities. Based on the research findings, PSNP participants were doubtful about the effectiveness of such community asset building activities as little or nothing had been done with regard to the creation of assets at the household level. An assessment was carried out after three years of PSNP implementation, and out of 74,000 beneficiaries so far only 1215 (2%) had graduated from the program. It was also observed that people fell back again into food insecurity after graduation from PSNP.

This fact raises the issues regarding the sustainability programs' impact. In spite of years of PSNP efforts, many households were not able to withstand one major drought season. The first reason is that the amount of money allocated to individuals, Birr 32 (8 USD) per month per person, is low and it is very difficult for the individuals to use it for other productive investments. The second reason is that, due to a lack of resources, it is the poorest of the poor, the landless, and the near to landless, who are involved in PSNP. These segments of the population are with little or no initial assets. A final reason is that PSNP and other income generation programs are not well tailored to create a viable asset base. PSNP must be coordinated with other income generation schemes. In an area where deepening food insecurity exists, the problems cannot be addressed by quick fixes; rather, recovery and sustainable development in Konso requires both time and resource investments. As such, PSNP graduation needs to be location-specific and the underlying constraints and potentials which farmers have to deal with must be also considered. The resources of the government and donors must be used to building community infrastructure and services. In this respect, successful interventions can be achieved provided assets are protected through times of drought, and productive investments are made. Otherwise, such intervention efforts would not only waste resources but would also result in a dependency situation for the Konso communities.

It was mentioned that income from non farm activities, mainly from daily labour or from seasonal migration, was being used to meet household food

demands. The income generation program, which is a part of the *Woreda* food security program, has been implemented through the provision of community loans which help individuals to get involved in small business in their area. This programs aids in improving individuals' income and household food security. Based on the research findings, when considering the impact of the program, it was discovered that only 15 of the 40 *Kebeles* were benefiting from the program; with half of them being recently included. Under the program, about 18,000 USD was allocated to each *Kebele*. For many of the *Kebeles* and households, this alternative mechanism was not adequately in place. Farmers in the group discussion indicated that they were more interested, and considered the loan to be more beneficial, when combined with a safety-net. The farmers also suggested the possibility of raising the amount of loan.

Economic capability/market, household capacity/ financial asset, skill, processing time, loan amount, information and shortage of staff are some of the limiting factors concerning the effectiveness of the program. As the land is already fragmented in the study area, the land inheritance tradition for every male member of the household is becoming a near-impossible option. In addition, Konso's youth are becoming less interested in farming and the number of landless youth seeking other means of livelihoods is increasing rapidly. As such, involvement in income generation and self employment should be encouraged, and polices need to recognize and increase support which also reduces the pressure on land as well as migration of the rural youth from villages. Investment in basic infrastructure, improving existing ones and expanding rural financial and credit institutions to meet farmers' needs and investing in human development are some of the measures that are necessary to help diversify and transform the communities' livelihoods. Enhancing non-farm employment options and policies that stimulate engines of rural economic growth are also key factors in reducing vulnerability.

Based on the research findings, the economic and environmental contributions from trees were well recognized by all farmers, and the role of trees appears to be changing over time. About 87% of the farmers showed interest in growing trees. In addition to meeting subsistence needs, the rapidly growing local demand for wood is shifting sources of cash and offering individuals an opportunity to diversify sources of income. With regard to the most important uses of trees in male headed households were: construction wood accounted (69%), fodder (35%), human food (12%),

firewood (12 %). Women choice on uses of trees in male headed household, fuelwood accounted for 65 % while fodder and human food accounted for 38% and 35%. On the other hand in female headed households primary uses and need for trees were similar to male headed households i.e. for construction. The importance of cattle feed and human food was more or less the same in both cases. Farmers viewed the neighboring districts as a potential market for construction wood and fruits. Farmers were willing to plant trees on their farm land and homesteads if provided with seedlings of the preferred species (i.e. mainly those used for construction, fodder and fruit production). The farmers also faced a shortage of land and planting materials for the preferred tree species. These issues have been undermining tree planting strategies in the study area. The community sees the current land tenure system as having no influence on tree planting and soil conservation; however, an uncertainty of tenure was emerging following the move of the Government to potentially begin a land certification program. Timely clarifications are needed. The challenge lies in creating an enabling policy environment and institutional support to remove existing constraints. Growing trees on farms in the form of agroforestry represents an important opportunity for meeting these demands. Furthermore, the development of multipurpose agroforestry or farm tree planting need to be linked with market-oriented tree or fruit production, which could encourage farmers in the study area. The on-going PSNP activities do promote conservation of the natural resources base, and forestry is a useful policy instrument. However, mechanisms should be developed to extend support to private tree planting as a key complementary strategy, and it should also be kept in mind when thinking about farmers' priorities and preferences.

Institutions, particularly the informal ones, play a key role in rural communities. They influence not only the social behavior of individuals, but also the individuals' access to (and use of) common resources. The establishment of local partnerships with communities and informal institutions in development work is an essential first step to work effectively toward common goals. There is a lot of knowledge and practices available within communities. Developing opportunities that exploit and capitalize on the local biodiversity, traditional and local knowledge and other underestimated assets are needed. An increased appreciation and building on local resources and knowledge could help to ensure the continuity of initiatives and ownership. As such, the study suggests that it is of utmost importance to look into the meaning and value of practices in a context-

specific manner. By strengthening the capacities of informal institutions and communities it would enable a greater ability to tap into this valuable knowledge; and to apply this critical insight in a way which complements the formal structure of development efforts.

References

Adger, W. (2000). Social and ecological resilience: are they related? *Progress in Human Geography* 24(3), 347.

Adger, W.N. (2006). Vulnerability. *Global Environmental Change* 16(3), 268-281.

Adger, W.N., Kelly, P.M., Winkels, A., Huy, L.Q. & Locke, C. (2002). Migration, remittances, livelihood trajectories, and social resilience. *Ambio* 31(4), 358-366.

Agrawal, A. (2008). The role of local institutions in adaptation to climate change. In: *Proceedings of Paper prepared for the Social Dimensions of Climate Change, Social Development Department, The World Bank, Washington DC, March 5-6, 2008.*

Agrawal, A. & Gibson, C.C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* 27(4), 629-649.

Allison, E.H. & Horemans, B. (2006). Putting the principles of the Sustainable Livelihoods Approach into fisheries development policy and practice. *Marine Policy* 30(6), 757-766.

Alsop, R., Bertelsen, M. & Holland, J. (2005). *Empowerment in practice: From analysis to implementation.* World Bank Publications.

Arnold, J.E.M. (1998). Joint Forest Planning and Management (JFPM) and Sustainable Rural Livelihoods in India. Paper prepared for the DFID Rural Development Office, Delhi.

Arnold, M.E.J. & Dewees, A.P. (1997). *Farms, Trees and Farmers: Response to Agricultural Intensification.* Earthscan.

Ashley, C. & Carney, D. (1999). *Sustainable livelihoods: lessons from early experience.* (Sustainable livelihoods: lessons form early experience

Bagchi, D., Blaikie, P., Cameron, J., Chattopadhyay, M., Gyawali, N. & Seddon, D. (1998). Conceptual and Methodological challenges in the study of livelihood Trajectories: Case-studies in Eastern India and Western Nepal. *Journal of International Development* 10(4)

Barrett, C.B., Reardon, T. & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. *Food Policy* 26(4), 315-331.

Barrett, C.B. & Swallow, B.M. (2006). Fractal poverty traps. *World Development* 34(1), 1-15.
Baumann, P. (2000). *Sustainable livelihoods and political capital: Arguments and evidence from decentralization and natural resource management in India*. London: Overseas Development Institute. ISBN
Bebbington, A. (1999). Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty. *World Development* 27(12), 2021-2044.
Bekele, M., Kassa, H. & Campbell, B. (forthcoming). Learning from the Landscape Past. Explaining Inadequate Tree Planting in Ethiopia
Bell, S. & Morse, S. (1999). *Sustainability Indicators.Measuring the Immesurable*. London: Earthscan.
Bellow, J., Hudson, R. & Nair, P. (2008). Adoption potential of fruit-tree-based agroforestry on small farms in the subtropical highlands. *Agroforestry Systems* 73(1), 23-36.
Berkes, F. & Folke, C. (1998). Linking social and ecological systems for resilience and sustainability. In: Berkes, F.*, et al.* (Eds.) *Linking social and ecological systems: management practices and social mechanisms for building resilience.* Cambridge Univ Pr.
Beyene, Y. (1999). Konso-Gardula, archaeological site and cultural landscape, witness to a living culture. In: Rossler, M.*, et al.* (Eds.) *Proceedings of The World Heritage Convention and Cultural Landscapes in Africa*, Kenya.
Bird, N. & Dickson, C. (2005). Poverty Reduction Strategy Papers: making the case for forestry. *Forestry Briefing*
Bishaw, B., Abdelkadir, A. & Awassa, E. (2003). Agroforestry and Community Forestry for Rehabilitation of Degraded Watersheds on the Ethiopian Highlands. In: *Proceedings of International Symposium on Contemporary Development Issues in Ethiopia, July 11-12,*, Addis Ababa, Ethiopia.
Block, S. & Webb, P. (2001). The dynamics of livelihood diversification in post-famine Ethiopia. *Food Policy* 26(4), 333-350.
Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge University.
Brooks, N., Neil Adger, W. & Mick Kelly, P. (2005). The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change Part A* 15(2), 151-163.
Brundtland, G.H. (1987). *Our Common Future*. Oxford: Oxford University Press. (Report on World Commission on Environment and Development
Bryceson, D. (2000). *Rural Africa at the Crossroads: Livelihood Practices and Policies*. Overseas Development Institute.
Bryceson, D.F. (2002). The Scramble in Africa: Reorienting Rural Livelihoods. *World Development* 30(5), 725-739.
Bryman, A. (2004). *Social Research Methods (2nd edition)*. Oxford: Oxford University Press.
Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research* 1(1), 8.
Cairns, J. (1997). Defining goals and conditions for a sustainable world. *Environmental Health Perspectives* 105(11), 1164-1170.
Carney, D. (Ed.) (1998). *Sustainable rural livelihoods:what contribution can we make?* London: Departmnet for International Development (DFID).

Carney, D. (2003). *Sustainable livelihoods approaches: progress and possibilities for change*. Department for International Development London.

Carswell, G. (2002). Livelihood diversification: increasing in importance or increasingly recognized? Evidence from southern Ethiopia. *Journal of International Development* 14(6)

Carvalho, S. & White, H. (1997). *Combining Quantitative and Qualitative Approaches to Poverty Measurement and Analysis: The Practice and the Potential'*. World Bank.

CGIAR (2007). Policy Conference on Collective Action and Property Rights for Poverty Reduction. In: *Proceedings of*, Entebbe, Uganda, 2007.

Chambers, R. (1989). Editorial Introduction: Vulnerability, Coping and Policy'. *IDS Bulletin, Vol.20, No.2, pp.1-7*

Chambers, R. (1994). Participatory rural appraisal (PRA): Analysis of experience. *World Development* 22(9), 1253-1268.

Chambers, R. (1997). *Whose reality counts?* London: Intermediate Technology

Chambers, R. & Conway, G.R. (1992). *Sustainable rural livelihoods:practical concepts for the 21st century*. . (IDS Discussion Paper 296 ISBN

Chambers, R. & Sussex, U.o. (1987). *Sustainable livelihoods, environment and development: putting poor rural people first*. Institute of Development Studies.

Clay, D.C., Molla, D. & Habtewold, D. (1999). Food aid targeting in Ethiopia: A study of who needs it and who gets it. *Food Policy* 24(4), 391-409.

Cleaver, F. (1999). Paradoxes of participation: questioning participatory approaches to development. *Journal of International Development* 11(4), 597-612.

Creswell, J. (2003). *Research Design: Qualitative, Quantitative, and Mixed Method Approaches*. Sage Publications Inc.

CSA (2006). Agricultural Sample Survey. Addis Abeba:

CSA (2007). National Population and Housing Census of Ethiopia. Addis Abeba, Ethiopia:

Davies, S., Buchanan, S. & Lambert, R. (1991). Early warning in the Sahel and the Horn of Africa: a review of the literature". IDS Research Report No. 20. Brighton, Institute of Development Studies

Degrande, A., Schreckenberg, K., Mbosso, C., Anegbeh, P., Okafor, V. & Kanmegne, J. (2006). Farmers' Fruit Tree-growing Strategies in the Humid Forest Zone of Cameroon and Nigeria. *Agroforestry Systems* 67(2), 159-175.

Deininger, K. & Jin, S. (2006). Tenure security and land-related investment: Evidence from Ethiopia. *European Economic Review* 50(5), 1245-1277.

Delgado, C., Hazell, P., Hopkins, J. & Kelly, V. (1994). Promoting Intersectoral Growth Linkages in Rural Africa through Agricultural Technology and Policy Reform. *American Journal of Agricultural Economics* 76(5), 1166-1171.

Dercon, S. (2004). Growth and shocks: evidence from rural Ethiopia. *Journal of Development Economics* 74(2), 309-329.

Dercon, S. (2006). Economic reform, growth and the poor: Evidence from rural Ethiopia. *Journal of Development Economics* 81(1), 1-24.

Devereux, S. (2000). Food insecurity in Ethiopia: A Discussion Paper for DFID IDS Sussex.

Devereux, S. (2001). Livelihood Insecurity and Social Protection: A Re-emerging Issue in Rural Development. *Development Policy Review* 19(4), 507-519.

Devereux, S. (2006). *Vulnerable Livelihoods in Somali Region, Ethiopia*. Institute of Development Studies.

Devereux, S. & Maxwell, S. (2001). *Food security in sub-Saharan Africa*. Intermediate Technology.

DFID (2002). Better livelihoods for poor people: The Role of Land Policy, discussion paper.

Dilley, M. & Boudreau, T.E. (2001). Coming to terms with vulnerability: a critique of the food security definition. *Food Policy* 26(3), 229-247.

Donham, D. & James, W. (1986). *The Southern Marches of Imperial Ethiopia: essays in history and social anthropology*. Cambridge University Press.

Doocy, S., Teferra, S., Norell, D. & Burnham, G. (2005). Credit program outcomes: coping capacity and nutritional status in the food insecure context of Ethiopia. *Social Science & Medicine* 60(10), 2371-2382.

Eakin, H. & Luers, A. (2006). Assessing the vulnerability of social-environmental systems. *Annu Rev Environ Resour : 31, 365-394.*

EEA (2004/05). *Ethiopian Economic Association: Report on the Ethiopian Economy. Addis Abeba, Ethiopia*. ISBN

Ehrenfeld, J. (2008). Sustainability needs to be attained, not managed. *Sustainability: Science, Practice, & Policy* 4(2), 1-3.

Elise, D. (2002). Woods (MURA) and social organization in Konso (southwestern Ethiopia) Elise Demeulenaere. *Journal of Ethiopian Studies* 35(2), 81-111.

Ellis, F. (1999). Rural livelihood diversity in developing countries: evidence and policy implications. *Natural Resource Perspectives* 40(8)

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford University Press.

Ellis, F. & Biggs, S. (2001). Evolving Themes in Rural Development 1950s-2000s. *Development Policy Review* 19(4), 437-448.

Ezra, M. (2001). Demographic responses to environmental stress in the drought- and famine-prone areas of northern Ethiopia. *International Journal of Population Geography* 7(4), 259-279.

FAO (1984). Food and Agricutural Organization: Ethiopian Highland Reclamation Study.

Farrington, J., Carney, D., Ashley, C. & Turton, C. (1999). *Sustainable livelihoods in practice: Early applications of concepts in rural areas* ODI (Natural Resources Perspective 42, June). ISBN

FDRE (2002). Federal Democratic Republic of Ethiopia: Food Security Strategy, Addis Abeba, Ethiopia.

Folke, C., Steve Carpenter, Thomas Elmqvist, Gunderson, L., CS Holling, Brian Walker, Jan Bengtsson, Fikret Berkes, Johan Colding, Kell Danell, Malin Falkenmark, Line Gordon, Roger Kasperson, Nils Kautsky, Ann Kinzig, Simon Levin, Karl - Göran Mäler, Fredrik Moberg, Leif Ohlsson, Per Olsson, Elinor Ostrom, Walter Reid, Johan Rockström, Savenije, H. & Svedin, U. (2002). *Resilience and Sustainable Development: Building adaptive Capacity in a World of Transformation*. ISBN

Frankenberger, T. (1992). Indicators and data collection methods for assessing household food security. *Household food security: Concepts, indicators, and methods*

Frankenberger, T. & Drinkwater, M. (1998). The household livelihood security concept. *Food Nutrition and Agriculture*(22)

FSS (2006). *Understanding the Dynamics of Resettlement in Ethiopia, Policy Briefings No. 4*. Addis Ababa. : ISBN

Gebrehiwot, K. (2004). Dryland Agroforestry Strategy for Ethiopia. *Drylands Agroforestry Workshop*. ICRAF,Nairobi, Kenya:

Gibbon, D., Lake, A. & Stocking, M. (1995). Sustainabel development: A challenge for agriculture. In: Morse, S.*, et al.* (Eds.) *People and Environmnet*. England: UCL Press.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory o f Structuration. Oxford, UK: Polity Press*.

Hallpike, C.R. (1972). *The Konso of Ethiopia. A Study of the Values of Cushitic People*. Oxford.: Oxford University Press

Havnevik, K., Negash, T. & Beyene, A. (Eds.) (2006). *Of Global Concern: Rural Livelihood Dynamics and Natural Resource Governance*. Sida, Stockholm:

Helmke, G. & Levitsky, S. (2004). Informal institutions and comparative politics: A research agenda. *Perspectives on Politics* 2(04), 725-740.

Hickey, S. & Mohan, G. (2005). Relocating Participation within a Radical Politics of Development. *Development and Change* 36(2), 237-262.

Holden, S., Shiferaw, B. & Pender, J. (2004). Non-farm income, household welfare, and sustainable land management in a less-favoured area in the Ethiopian highlands. *Food Policy* 29(4), 369-392.

Holden, S. & Yohannes, H. (2002). Land redistribution, tenure insecurity, and intensity of production: A study of farm households in Southern Ethiopia. *Land Economics* 78(4), 573.

Holliday, A. (2002). *Doing and writing qualitative research*. Sage Publications Ltd.

Hopwood, B., Mellor, M. & O'Brien, G. (2005). Sustainable development: mapping different approaches. *Sustainable Development* 13(1), 38-52.

Hurni, H. (1989). Applied Soil Conservation Research in Ethiopia. In: Thomas, D.B. (Ed.) *Soil and Water Conservation in Kenya: Proceedings of the Third National Workshop* Nairobi:

IFAD (1998). Drylands: A Call to Action. Rome: The Economic Policy and Resource Strategy Department. .

Inanaga, S., Eneji, A., An, P. & Shimizu, H. (2005). A recipe for sustainable agriculture in drylands. In: Omasa, K.*, et al.* (Eds.) *Plant Responses to Air Pollution and Global Change*. pp. 285-293.

Jafry, T. (2000). Women, human capital and livelihoods: an ergonomics perspective. *ODI Natural Resource Perspectives* 54

Jagger, P. & Pender, J. (2003). The role of trees for sustainable management of less-favored lands: the case of eucalyptus in Ethiopia. *Forest Policy and Economics* 5(1), 83-95.

Jama, B., Elias, E. & Mogotsi, K. (2006). Role of agroforestry in improving food security and natural resource management in the drylands: a regional overview. *Journal of the Drylands* 1(2), 206-211.

Jayne, T.S., Strauss, J., Yamano, T. & Molla, D. (2002). Targeting of food aid in rural Ethiopia: chronic need or inertia? *Journal of Development Economics* 68(2), 247-288.

Kaluski, D., Ophir, E. & Amede, T. (2001). Food security and nutrition–the Ethiopian case for action. *Public Health Nutrition* 5(03), 373-381.

Keeley, J. & Scoones, I. (2003). *Understanding environmental policy processes: Cases from Africa.* Earthscan/James & James.

Kelly, P.M. & Adger, W.N. (2000). Theory and Practice in Assessing Vulnerability to Climate Change andFacilitating Adaptation. *Climatic Change* 47(4), 325-352.

Leach, M., Mearns, R. and Scoones, I. (1999). Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. *World Development* 27(2), 225-247.

Leakey, R., Tchoundjeu, Z., Schreckenberg, K., Shackleton, S. & Shackleton, C. (2005). Agroforestry Tree Products(AFTPs): Targeting Poverty Reduction and Enhanced Livelihoods. *International Journal of Agricultural Sustainability* 3(1), 1-23.

Lean, G. (1995). *Down to Earth: A Simplified Guide to the Convention to Combat Desertification, why it is Necessary, and what is Important and Different about it.* Published by the Centre for Our Common Future in collaboration with Interim Secretariat for the Convention to Combat Desertification.

Leo de Haan, A.Z. (2005). Exploring the Frontier of Livelihoods Research. *Development and Change* 36(1), 27-47.

Long, N. (1997). Agency and Constraint, Perceptions and Practices:A Theoretical Position. In: Long, N.*, et al.* (Eds.) *Images and Realities of Rural Life*. Van Gorcum. The Netherlands.

Løvendal, C., Knowles, M. & Horii, N. (2004). Understanding Vulnerability to Food Insecurity Lessons from Vulnerable Livelihood Profiling. In: Agricultural and Development Economics Division, F.a.A.O.o.t.U.N. (Ed.)

Marschke, J. & Berkes, F. (2006). Exploring Strategies that Build Livelihood Resilience: a Case from Cambodia. *Ecology and Society* 11(1/42)

Maxwell, D.G. (1996). Measuring food insecurity: the frequency and severity of "coping strategies". *Food Policy* 21(3), 291-303.

McLaughlin, P. & Dietz, T. (2008). Structure, agency and environment: Toward an integrated perspective on vulnerability. *Global Environmental Change* 18(1), 99-111.

Morduch, J. (1995). Income Smoothing and Consumption Smoothing. *The Journal of Economic Perspectives* 9(3), 103-114.

Mortimore, M. (2005). Social Resilience in African Drylanf Livelihoods:Deriving Lessons for Policy. In: Gausset, Q.*, et al.* (Eds.) *Beyond territory and scarcity: exploring conflicts over natural resource management,*. Nordic Africa Institute.

Mortimore, M.J. & Adams, W.M. (2001). Farmer adaptation, change and [`]crisis' in the Sahel. *Global Environmental Change* 11(1), 49-57.

Murray, S., Burke, L., Tunstall, D. & Gilruth, P. (1999). Drylands population assessment II, World Resources Institute and UNDP Office to Combat Drought and Desertification, New York. . *A Draft paper for WRI and UNSO/UNDP.*

Nichola, T. (2006). The food security problem in Ethiopia -a supply side analysis. *South African Journal of Economics* 74(2), 315-322.

Niehof, A. (2004). The significance of diversification for rural livelihood systems. *Food Policy* 29(4), 321-338.

Norton, A. & Foster, M. (2001). *The potential of using sustainable livelihoods approaches in poverty reduction strategy papers*. Overseas Development Institute.

Nuijten, M. (1992). Local Organisation as Organising Practices: Rethinking Rural Institutions. In: Long, N., *et al.* (Eds.) *Battlefields of knowledge: the interlocking of theory and practices in social research and development*. London and New York: Routledge.

Nyong, A., Adesina, F. & Osman Elasha, B. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change* 12(5), 787-797.

ODI (2002). Rethinking Rural Development. *Odi briefing paper*

ODI (2009). *Getting it right*: *Understanding livelihoods to reduce the vulnerability* of *pastoral communities: syntehisi paper.*

Okali, C., Sumberg, J. & Farrington, J. (1994). *Farmer participatory research:rhetoric and reality*. Intermediate Technology Publ.

Ong, C.K., Wilson, J., Deans, J.D., Mulayta, J., Raussen, T. & Wajja-Musukwe, N. (2002). Tree-crop interactions: manipulation of water use and root function. *Agricultural Water Management* 53(1-3), 171-186.

Otsuka, K. & Yamano, T. (2006). Introduction to the special issue on the role of nonfarm income in poverty reduction: evidence from Asia and East Africa. *Agricultural Economics* 35(s3), 393-397.

Pankhurst, R. (1985). *The History of Famine and Epidemics in Ethiopia Prior to the Twentieth Century* Addis Ababa.:

PASDEP (2006). A Plan for Accelerated and Sustained Development to End Poverty. In: (MoFED), M.o.F.a.E.D. (Ed.) Addis Ababa:

Pasteur, K. (2001). Tools for sustainable livelihoods: policy analysis. *Institute of Development Studies*.

Plummer, R. & Armitage, D. (2007). A resilience-based framework for evaluating adaptive co-management: Linking ecology, economics and society in a complex world. *Ecological Economics* 61(1), 62-74.

Pretty, J. (1995). *Regenerating agriculture: policies and practice for sustainability and self-reliance.* London: Earthscan.

Rahmato, D. (1984). *Agrarian reform in Ethiopia.* Nordic Africa Institute.

Rahmato, D. (1991). *Famine and survival strategies: a case study from northeast Ethiopia.* Nordic Africa Institute.

Rapley, J. (2002). *Understanding Development: Theory and Practice in the Third World*. USA: Lynee Rienner.

Reardon, T., Stamoulis, K. & Pingali, P. (2007). Rural nonfarm employment in developing countries in an era of globalization. *Agricultural Economics* 37(s1), 173-183.

Reenberg, A., Birch-Thomsen, T., Mertz, O., Fog, B. & Christiansen, S. (2008). Adaptation of Human Coping Strategies in a Small Island Society in the SW Pacific—50 Years of Change in the Coupled Human–Environment System on Bellona, Solomon Islands. *Human Ecology* 36(6), 807-819.

Ritzer, G. (Ed.) (1996). *Classical Sociological Theory (Second Edition). The McGraw-Hill Companies, INC.*

Schuren, S. & Snelder, D. (2008). Tree Growing on Farms in Northeast Luzon: Smallholders' Motivations and Other Determinants for Adopting Agroforestry. In: Snelder, D., *et*

al. (Eds.) *Smallholder Tree Growing for Rural Development and Environmental Services: Lessons from Asia*. Springer.

Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. *Working Paper-Institute of Development Studies, University of Sussex (United Kingdom)*

Scoones, I. (2009). Livelihoods perspectives and rural development. *Journal of Peasant Studies* 36(1), 171-196.

Sen, A. (1981). Poverty and Famines: An Essay on Entitlement and Deprivation. Clarendon Press, Oxford.

Shortall, S. (2004). Social or Economic Goals, Civic Inclusion or Exclusion? An Analysis of Rural Development Theory and Practice. *Sociologia Ruralis* 44(1), 109-123.

Simons, A.J. & Leakey, R.R.B. (2004). Tree domestication in tropical agroforestry. *Agroforestry Systems* 61-62(1), 167-181.

Slater, R., Ashley, S., Tefera, M., Buta, M. & Esubalew, D. (2006). PSNP Policy, Programme and Institutional Linkages.

Smit, B. & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change* 16(3), 282-292.

Snelder, D., Klein, M. & Schuren, S. (2007). Farmers preferences, uncertainties and opportunities in fruit-tree cultivation in Northeast Luzon. *Agroforestry Systems* 71(1), 1-17.

Solesbury, W. (2003). Sustainable Livelihoods:A Case Study of the Evolution of DFID Policy. London: Overseas Development Institute.

Sood, K. & Mitchell, C. (2009). Identifying important biophysical and social determinants of on-farm tree growing in subsistence-based traditional agroforestry systems. *Agroforestry Systems* 75(2), 175-187.

Srivastava, K., Mesfin, A., Abiye, A., Mitiku, H. & Hailu, R. (1993). Distribution and importance of Ethiopian Vertisols and location of study sites

Start, D. (2001). The Rise and Fall of the Rural Non-farm Economy: Poverty Impacts and Policy Options. *Development Policy Review* 19(4), 491-505.

Start, D. & Johnson, C. (2004). *Livelihood options?: the political economy of access, opportunity and diversification*. Overseas development institute (ODI).

Swift, J. & Hamilton, K. (2001). Household food and livelihood security. In: Devereux, S.*, et al.* (Eds.) *Food Security in sub-Saharan Africa*. London.: ITGD Publishing.

Taddese, G. (2001). Land Degradation: A Challenge to Ethiopia. *Environmental Management* 27(6), 815-824.

Tefera, T., Perret, S. & Kirsten, J. (2004). Diversity in livelihoods and farmers' strategies in the Hararghe Highlands, eastern Ethiopia. *International Journal of Agricultural Sustainability* 2(2), 133-146.

Teshome, A. (2006). Agriculture, Growth and Poverty Reduction in Ethiopia: Policy Processes Around the New PRSP (PASDEP). In: *Proceedings of* pp. 20-22.

Toner, A. & Franks, T. (2006). Putting livelihoods thinking into practice: implications for development management. *Public Administration and Development* 26(1), 81-92.

Turner, B., Kasperson, R., Matson, P., McCarthy, J., Corell, R., Christensen, L., Eckley, N., Kasperson, J., Luers, A. & Martello, M. (2003). A framework for vulnerability

analysis in sustainability science. *Proceedings of the National Academy of Sciences* 100(14), 8074-8079.

Vatn, A. (2005). *Institutions and the Environment*. Edward Elgar Pub.

Vincent, K. (2007). Uncertainty in adaptive capacity and the importance of scale. *Global Environmental Change* 17(1), 12-24.

Warner, M., Bezkorowajnyj, P. & Rana, R. (1999). *Matching livelihood needs to tree selection in high potential farming systems: lessons from participatory research in Nepal and India*. ODI Agricultural Research & Extension Network.

Watson, E. (2004). Agriculture Intensification and Social Stratification Konso in Ethiopia Contrasted with Marakwet. In: Widgren, M.*, et al.* (Eds.) *Islands of Intensive Agriculture in Eastern Africa*. James Currey Publishers, 2004.

Watts, M.J. & Bohle, H.G. (1993). Hunger, famine and the space of vulnerability. *GeoJournal* 30(2), 117-125.

Way, S. (2006). Examining the links between poverty and land degradation: from blaming the poor toward recognising the rights of the poor. In: Johnson, P., M*, et al.* (Eds.) *Governing global desertification: linking environmental degradation, poverty and participation*. pp. 27.

Weigelt, J. (2008). Analysing Access to Tropical Forests: Analytical Implications of Critical Realism for Community Forestry Management Research

Whitehead, A. (2002). Tracking Livelihood Change: Theoretical, Methodological and Empirical Perspectives from North-East Ghana. *Journal of Southern African Studies* 28(3), 575-598.

Wisner, B., Blaikie, P. & Cannon, T. (2004). *At risk: natural hazards, people's vulnerability and disasters*. Routledge.

Wisner, B. & Luce, H.R. (1993). Disaster vulnerability: Scale, power and daily life. *GeoJournal* 30(2), 127-140.

Woldemariam, M. (1984). *Rural Vulnerability to Famine in Ethiopia, 1958-77*.

Woldenhanna, T. & Oskam, A. (2001). Income diversification and entry barriers: evidence from the Tigray region of northern Ethiopia. *Food Policy* 26(4), 351-365.

Wood, A. (1987). *The State, Soil Erosion and Environmental Conservation in Ethiopia*.

World Bank (1986). Poverty and Hunger: Issues and Options for Food Security in Developing Countries. Washington, DC *World Bank Policy Study*

World Bank (2006). Investing in Drought Preparedness Prepared by Water for Food Team.

Yohe, G. & Tol, R.S.J. (2002). Indicators for social and economic coping capacity--moving toward a working definition of adaptive capacity. *Global Environmental Change* 12(1), 25-40.

Young, A. (2000). How much spare land exists? . *Bulletin of International Union of Soil Sciences*.

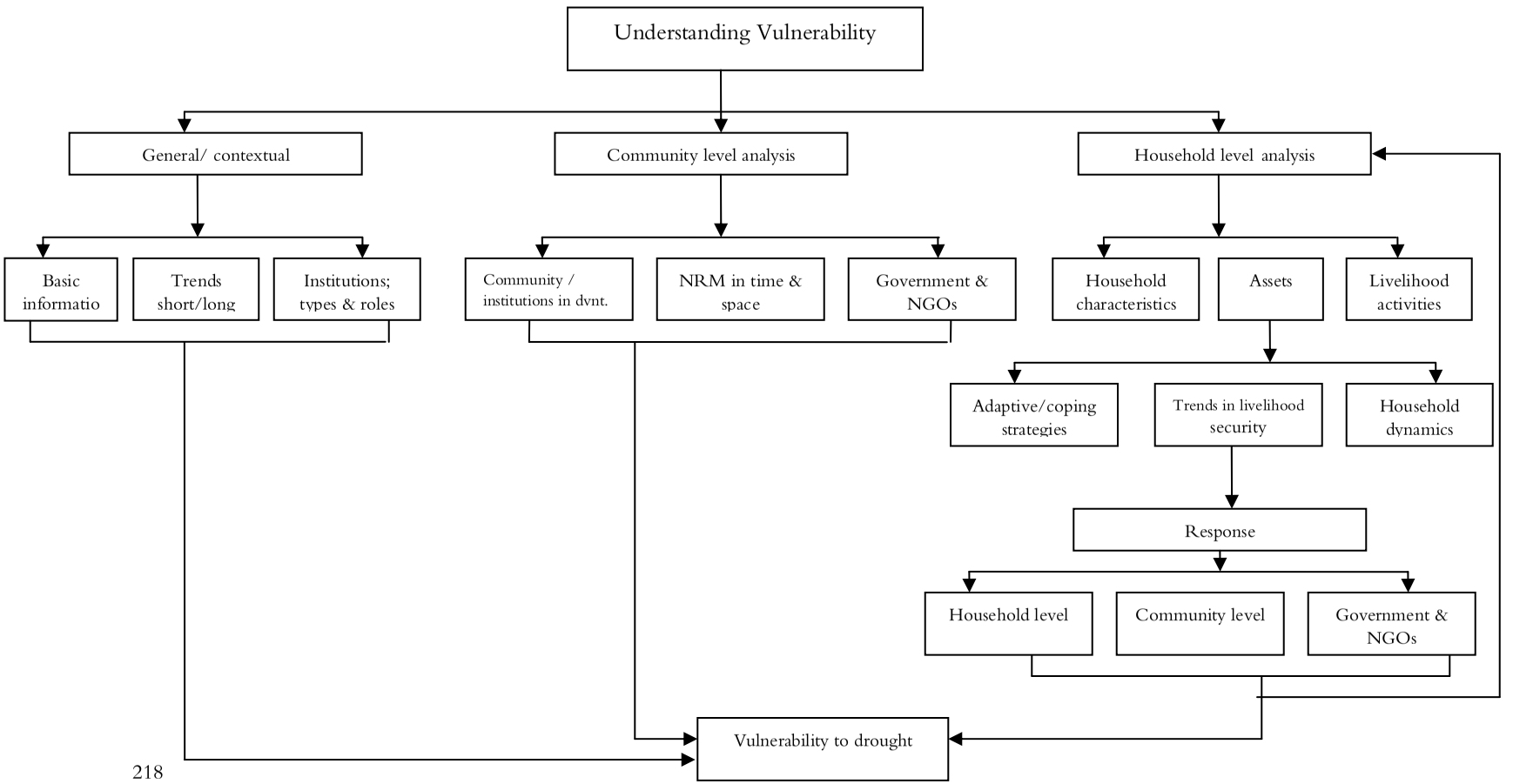
Annexes

Annex 1 .The main activities in the research and method used to generate data

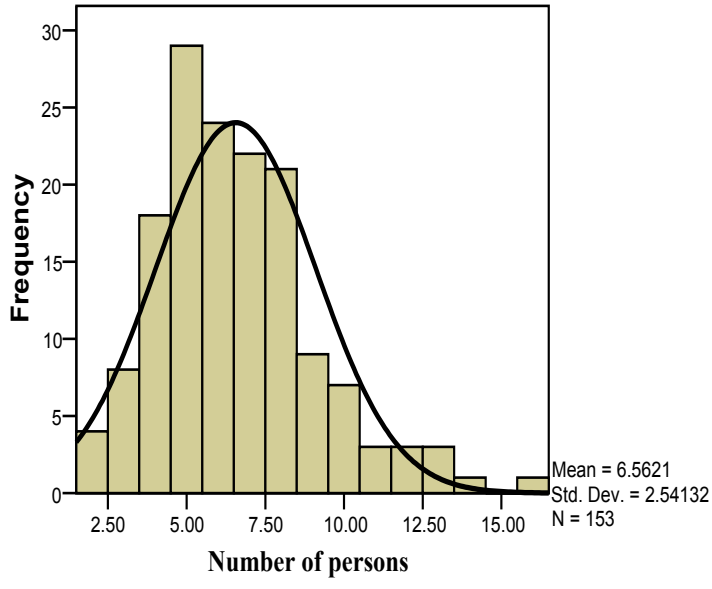
Periods	Place	Main tasks	Methods
September 2004-March 2005	Sweden	Course work	
August, 2005	Awassa & Konso	Clearance and support form Regional Bureau Agriculture Introduction to Bureau of Agriculture and Rural development, *Woreda* Council, *Kebele* Administration and Development Agents Acquaintance with the environment and the study communities Contacting resource persons, recruiting field assistant Pilot study	Informal /general discussion, short presentation, focus group and individual discussion(elderly, women, PSNP beneficiaries and non beneficiaries, preference ranking exercise, Venn diagram, visiting farmlands discuss farming and tree management practices,
April, 2006	Konso	Testing household survey questionnaire Preparation of guidelines for the survey Selection of *Kebeles*, villages and sample households for the survey	Selection *Kebele* based on tree cover from aerial photograph, ground survey, distance main road, involvement in income generation scheme, random selection of households samples from the *Kebele* Administration list
May-June 2006	Addis, Awassa & Konso	Improving questionnaire through feedback from the local supervisor and other individuals Training of enumerators Conducting household survey	

Periods	Place	Main tasks	Methods
July-December	Wondo Genet & Addis Abeba	Entering data and partly analysis	SPSS software, MS Excel, discussion, conduct survey, key informant discussion, focus group discussion
		Literature search	
		Consulting Regional Bureau of Agriculture, Disaster Prevention and Preparedness Commission, regional food security office.	
		Measurement of sample households landholding, yield of sorghum in order to convert from local unit to standard unit	
		Addition/ repeating	
		Preliminary qualitative data collection on settlement history, vulnerability, drought, status of NRM and other assets, farmers' perception on their environment and interventions	
February-July 2007	Sweden	Analysis of data & write up	
		Presentation of 50% seminar	
August 2007-April 2008	Wondo Genet, Addis Abeba & Konso	Preparation for stakeholders workshop on the finding so far achieved and enhance its validity and identify gaps	Presentation of findings /workshop group discussion, plenary session, developing checklist for qualitative data collection,
		Developing thematic areas for the workshop discussion	
		Organizing the workshop; identifying and invitation of participating organization, farmers, experts, officials	
		Supervisor visit of the study area and facilitation the workshop	Focus group discussion with elderly, youth, experts and officials, key informants safety-net and credit program beneficiary farmers and non beneficiary, experts and local authorities
		Conducting workshop	
		Writing the workshop proceeding, analyzing and identifying gaps for additional fieldwork	
		Conducting more in depth qualitative study on local institution, intervention and safety net, migration, role of trees, Perception/changes in value and intervention	
		Writing abstract for a conference "Meeting Global Challenges in Research Cooperation", 27-29 May in Uppsala, Sweden	
May 2008 on wards	Sweden	Paper presentation and writing proceeding	
		Transcription and analysis of the final qualitative field data(audio and video and written notes	

Annex 2. Flow chart for the research procedure



Annex 3. Number of persons permanently living in a household



Annex 4. Population distribution by age and sex

Age group	Sex			
	Male		Female	
	frequency	%	Frequency	%
0-4	90	18.2	85	17.0
5-9	86	17.4	89	17.8
10-14	80	16.2	61	12.2
15-19	51	10.3	59	11.8
20-24	30	6.1	53	10.6
25-29	39	7.9	27	5.4
30-34	16	3.2	38	7.6
35-39	35	7.1	37	7.4
40-44	18	3.6	18	3.6
45-49	17	3.4	12	2.4
50-54	9	1.8	7	1.4
55-59	11	2.2	9	1.8
60-64	4	0.8	2	0.4
65+	8	1.6%	4	0.8
Total	494	100.0	501	100.0

Annex 5. Educational background of Respondents

Respondents		*Educational level*				Total
		Illiterate	Read & write	Primary edu.	Sec edu	
Male HH	Number	89	11	15	5	120
	% within Respondents	74.2%	9.2%	12.5%	4.2%	100.0%
Female HH	Number	28	5	0	0	33
	% within Respondents	84.8%	15.2%	.0%	.0%	100.0%
Total	Number	117	16	15	5	153
	% within Respondents	76.5%	10.5%	9.8%	3.3%	100.0%

Annex 6. Educational level of household members

Age group	*Educational level*									Secondary education		
	illiterate			Read & write			Primary education					
	Male%	Female%	Total	Male%	Female%	Tota	Male%	Female%	Total	Male%	Female%	Tota
0-4												
5-9	25	41		2	1		19	13		0	0	
10-14	36	40		3	6		40	13		0	0	
15-19	18	51		6	2		21	6		6	0	
20-24	9	46		4	3		7	3		9	1	
25-29	22	27		4			6	0		7	0	
30-34	7	37		4	1		3	0		2	0	
35-39	21	32		4	5		8	0		2	0	
40-44	14	18		2	0		2	0		0	0	
45-49	15	12		1	0		1	0		0	0	
50-54	9	7		0	0		0	0		0	0	
55-59	11	9		0	0		0	0		0	0	
60-64	4	2		0	0		0	0		0	0	
65+	8	4		0	0		0	0		0	0	

Annex 7. Trees and shrub species used as a drought source of food (local names)

Edible leaves (Local name)	Edible fruit (Local name)	Edible roots (Local name)
Mareta	*Hangalta*	*Bagena*
Parapa	*Mudu kanta*	*Kuleya sagera*
Pasa	*Karsata*	*Qocheta*
Hangalta	*Lamta*	*Kurtota*
Hayla	*Qananta*	
Aloloqata	*Otayta*	
Rasuta	*Borborisa*	
Shelqta	*Tulaqta*	
Toqata	*Tenayta*	
Honona	*Gumanta*	
Qahapa	*Maderta*	
	Helteta	
	Duayta	
	Leya	
	Ruketa	