RESETTLEMENT, HOUSEHOLD VULNERABILITY, LIVELIHOOD ADAPTATION AND OPPORTUNITIES IN ETHIOPIA

(A CASE STUDY OF THE METEMA RESETTLEMENT AREA)

M.Sc THESIS

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DECLARATION

I Mihret Sahay hereby declare that this thesis is my original work and that all sources of materials used for this thesis have been duly acknowledged. This work has not been submitted to any other institution anywhere for the award of any academic degree, diploma and certificate or to any other publications.

Signature: Signature removed Date: Aug 30, 2010

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(A CASE STUDY OF THE METEMA RESETTLEMENT AREA)

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ABSTRACT

In Ethiopia planned resettlement programmes have been viewed as a key government strategy for addressing food insecurity, population pressure, landlessness, and environmental degradation since the early 1960s. Intensified resettlement efforts have also been implemented since 2002/2003.

This thesis examines the recent experience of resettlement through a case-study of the Metema Woreda resettlement site, located in the Amhara Regional State from a disaster risk lens through the application of the sustainable livelihoods framework.

Specifically, the study sought to examine the vulnerability and risk context of resettled households. It also aimed to investigate the ways in which household livelihoods are configured and differentiated in the new environment. In addition, the study gave particular attention to identify structural and institutional determinants that mediate household vulnerability in relation to key environmental shocks and stresses in three selected resettlement sites in Metema.

The methodology comprised both quantitative and qualitative research methods. Primary data were collected via a structured questionnaire survey that involved a sample of 93 resettled households in three purposively selected resettlement sites within Metema. In addition, focus group interviews, key informant interviews and field observations were also used. The analysis was undertaken through the application of a livelihood fragility index developed in the course of the study. Simple descriptive statistical techniques and direct quotes were also applied.

Study findings indicate a complex vulnerability context characterised by a diverse combination of naturally occurring threats including waterlogging, striga weed infestation and malaria, with poor household adaptation across the sites. Households were also exposed to export-related price volatility due to their dependence on cash cropping. Moreover, livelihood sources and strategies were poorly diversified across the three sites and largely limited to crop production which accounted for 83.4 percent of annual household income on average.

Across the three sites, research findings indicate complexities in the livelihood outcomes of the resettled households. The majority of households reported improved food security status and wellbeing compared to their original areas. However, these benefits do not seem sustainable due to numerous factors that are constraining effective adaptation.

However, the application of the livelihood fragility index revealed unexpected differences in the livelihood portfolios of households located in the different sites. This was illustrated by the seemingly anomalous index results for households residing in Wodi-Gemzu, characterised by highly fragile levels of financial and physical capital. Despite these constraints, livelihood fragility index values indicate a more favourable resettlement outcome for families in this site compared to the other areas. This was attributed to more robust access to natural capital in Wodi-Gemzu, due to its lower levels of land degradation.

The application of the livelihood fragility index also flagged issues of significant concern. It profiled the consistently high fragility of the social capital across the three sites. In addition, it also indicated differences in the livelihood portfolios between male-headed and female-headed households; female headed household having highly fragile livelihood portfolios.

The results underline the potential value of the livelihoods fragility index in resettlement contexts, and propose its application in similar studies.

Key Words: Ethiopia, Disaster risk, Resettlement, Vulnerability, Fragility, Livelihood and Adaptation

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ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
ADPC	Asian Disaster Preparedness Centre
CSA	Central Statistics Authority
ANRS	Amhara National Regional State
DFID	Department for International Development
DPPA	Disaster Prevention and Preparedness Agency
EC	European Commission
IGAD	Intergovernmental Authority on Development
EU	European Union
FDRE	Federal Republic of Ethiopia
FSCB M& E	Food Security Coordination Bureau Monitoring and Evaluation
FSCDPO	Food Security Coordination and Disaster Prevention Office
FSP	Food Security Coordination Bureau
GDP	Gross Domestic Product
IPMS	Improving Productivity and Market Success
IRR	Impoverishment Risk and Rehabilitation
LPM	Linear Probability Model
MOARD	Ministry of Agriculture and Rural Development
NGO	Non-Governmental Organization
SDPRP	Sustainable Development and Poverty Reduction Programme
SLF	Sustainable Livelihood Framework
SNNPR	Southern Nations Nationalities and People Region
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
UNDP	United Nations Development Programme
UNDP-GEF	United Nations Development Programme Global Environment Facility
UNHCR	United Nations High Commission for Refugees
UN-OCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development

CHAPTER ONE
INTRODUCTION TO THE STUDY

1.1 Identifying the Problem

Ethiopia is considered to be one of the world's food insecure countries and the most food-aid dependent (von Braun and Olofinbiyi 2007). This is evidenced by the need for recurring emergency food-aid programmes in the past decade, even in years of good harvest (World Bank 2003 cited in Goodo 2008; Ziegler 2005). It is also specifically reflected in the large-scale famine relief required for over 13 million people during 200/2003 (Ziegler 2005).

While instances of severe national food insecurity are in part explained by repeated droughts (Little 2008), they also signal declining agricultural productivity, especially in Ethiopia's highland regions. This is attributed to disproportionate population pressure in these areas due to the fact that 85% of all Ethiopians live in the highland zones (UNDP-GEF 2006), despite these regions constituting only 45% of total land areas (Austrian Development Cooperation ND; UNDP-GEF 2006). It is also reflected in smaller farm holdings and land fragmentation. These conditions are compounded by other factors, including outmoded farming practices, tenure insecurity and environmental degradation (Haile 2004; Belay 2004), all of which have contributed to declining agricultural output. Ethiopia is now viewed as less productive per capita than 20 years ago (Ethiopian Economic Association 2000 cited in Haile 2004).

Government responses to address this issue date back to the 1960s. and have included officially-sponsored resettlement programmes from the highlands to the more fertile lowlands. Specifically, this was reflected in approximately 190,000 families relocating to the lowlands between the years 2002–2007 (Federal Government's Food Security Programme Quarterly Bulletin 2007/2008), some of whom later reportedly returned to their villages of origin (Refugees International 2004).

However, resettlement remains a controversial policy issue. On one hand, agricultural and development specialists emphasise the inevitability and importance of resettlement programmes. On the other hand, donors and scholars have expressed reservations about the effectiveness of such initiatives in enhancing the livelihoods of those resettled (Belay 2004).

Proponents of resettlement programmes argue that the relocation of people from drought-prone and ecologically-degraded areas in the north and central highlands to the under-utilised lands in the

southwest and lowlands is necessary for economic and social development. They refer to the problems caused by the pressures of a growing population, reduced landholding sizes and the limited potential for intensive agriculture in the highlands. They also underline the limited availability of non-agricultural livelihood alternatives in a country where 85% of the people depend on agriculture (Black et al., ND; Ezra 2001a; Dejene 2003; Belay 2004).

The opposing view draws its argument from the results of government-sponsored resettlement programmes implemented during the military regime. These programmes (especially those which occurred in 1984/85) resulted in documented hardship, due to changes in environment and direct exposure to diseases along with insufficient government support (Black et al. ND). As a result, some scholars, as well as donor countries and NGOs, have been sceptical about the more recent programmes, arguing that resettlement may cause people to become 'worse off' than they were before (Belay 2004).

These opposing views on the effectiveness of resettlement in Ethiopia have been articulated in policy debates at a national level as well as by international organisations. However, they remain constrained by a lack of evidence-based research, particularly as applies to post 2002/2003 resettlement efforts.

Despite the urgent need for detailed information regarding the effectiveness of these recent resettlement efforts, research findings that explore the actual experience of resettlement from the perspective of the relocated households are limited; specifically those addressing local risks, constraints and opportunities as well as the coping and adaptation strategies adopted by households in the resettlement areas.

This study seeks to address these gaps in knowledge by investigating the subjective experience of resettlement through the lens of a livelihoods analytical framework, with a specific focus on selected households who resettled in 2002/2003–2004/2005 in three selected resettlement sites, in the district of Metema, North Gondar zone, located in the Amhara regional state of Ethiopia. A statistical tool (fragility index) has been utilised for a systematic comparison of livelihood fragility level and vulnerability context of households in terms of the five livelihood capitals of the livelihood framework in the selected resettlement areas.

1.2 Research Aims and Objectives

This study seeks to examine the vulnerability and risk context of households that have recently resettled from highland areas to Metema district, a lowland location in Amhara regional state, Ethiopia. The principal aim is to investigate the sources of livelihood of resettled households and the relative effectiveness of their livelihood strategies in the new areas.

It intends to achieve this by:

- Identifying the significant socio-economic, livelihood, health and environmental threats identified by sampled households and key informants in three selected resettlement sites
- Determining the ways in which household livelihoods are configured and differentiated in the three resettlement sites
- Identifying structural and institutional determinants that mediate household vulnerability in relation to key environmental shocks and stresses

These objectives are informed by studies that have been made on resettlement in different countries. The studies acknowledge that when people move to a new area they are faced with various difficulties and challenges in adapting to their altered circumstances, such as ecological, social, economic and cultural differences. They need to cope with or adapt to various environmental as well as non-environmental challenges to establish sustainable livelihoods (Cernea and Guggenheim 1993). The study objectives therefore seek to identify the major threats that are perceived to exist by the resettled households as well as their respective adaptive responses. It also recognises the importance of institutional factors in enabling/constraining household adaptation. Therefore, as an important research objective it focuses on structural conditions that enable or discourage adaptation.

1.3 Situating the Research Theoretically and Empirically

The objectives of the study situate the research theoretically within the broad domain of political ecology as it addresses issues of risk and vulnerability in marginalised communities. In this conceptualization, vigorously advanced by Blaikie et al (1994) and Wisner et al (2004), household risks are viewed as the outcome of the interaction between external shocks and stresses and internal conditions of household vulnerability.

This conceptualization also places the role of household livelihood strategies to the forefront, as they enable adaptive responses to new conditions, including perceived shocks and stresses. Similarly, it underlines the importance of structural and institutional factors as critical mediating forces that influence external socio-political and environmental conditions as well as internal household capacity.

Empirically, these research themes direct attention to particular research questions in relation to risks, household livelihoods and adaptive responses in the specific context of voluntary resettlement. Therefore, important empirical research questions for this study include:

- What are the main sources of livelihood of households in the resettlement sites?
- What are the differences in livelihood strategies across the three resettlement sites?
- How do institutional factors influence the robustness of household livelihood profiles in the three resettlement sites?
- What are the main environmental, socio-economic, and other shocks or stresses identified by sampled households and key informants in Metema?
- How effectively are resettled households coping with and adapting to the key environmental, and economic shocks and stresses in Metema?

1. 4 Limitations of the Study

The study has the following limitations:

Firstly, updated information was not available from appropriate government offices and other sources regarding the number of households resettled, as well as those who returned back to their villages of origin and the demographic and socioeconomic characteristics of these returnees. Such secondary information would have provided valuable insights into the households who could not cope and adapt to life in the resettlement area, in addition to the primary data obtained through surveys and interviews.

Secondly, the literature that informs this study is mostly derived from development-induced involuntary or forced displacement studies. Limited literature related to voluntary resettlement programmes undertaken as a response to population pressure or environmental degradation exists. Hence, critical analysis of the findings in relation to the published literature is limited.

Thirdly, it is possible that the information gathered regarding household income might not be reliable and accurate. This is due to respondent bias; respondents may have concealed their true levels of income. In addition, the households that were interviewed had no written financial records. However, this constraint was in part managed due to the timing of the field research, which took place immediately after harvest. The households' major source of income is crop production, and this allowed field observation of the household harvest. Furthermore, the distortions of respondent bias were addressed by the fact that household income from crop production was calculated using the independently-determined market price for that crop.

Fourth, the findings of the study cannot be generalized, as the sample size was too small to represent the entire population resettled and the local context might not be the same in all the resettlement sites.

1. 5 Organisation of the Thesis

The paper has eight chapters. The first chapter introduces the study by presenting the background, objectives and limitations of the research. The second chapter explores the literature. It provides an overview of the origins and emergence of disaster risk, examining concepts implicit in disaster risk such as vulnerability, hazard, resilience and resistance. This section also examines the link between livelihood and vulnerability and specifically introduces the sustainable livelihood framework. The chapter also provides an overview of the concept of food security and its link to household livelihood. Finally, it describes the importance of resettlement as adaptive strategy under conditions of environmental stress and associated risks. This is reflected in the review of two theoretical approaches ("inadequate input" and "inherent complexity" approaches). The third chapter provides the contextual background of the study, which includes the role of agriculture in the Ethiopian economy, as well as the influence of topography, population distribution in applying resettlement as a food security strategy in Ethiopia. Background is also provided about Ethiopia's resettlement history since the imperial regime and criticisms. It also examines severity of food insecurity and the implementation of planned resettlement as a solution. Finally, it provides background description about the study area. Chapter 4 describes the methodology used in the study, including data collection, consolidation and analysis methods. Chapter 5 presents vulnerability context of the study sites and the provision of essential services in the resettlement sites. Chapter 6 provides descriptive discussion on household socio-demographic characteristics, resettled household livelihood strategies and livelihood outcome at the resettlement sites. Chapter 7 investigates household livelihood profile in terms of the five capital assets across the three sites by applying "livelihood fragility" index. This chapter also examines the relation between livelihood profile and food security status of households. In the last chapter the findings are critically compared with the existing literatures in disaster risk as well as with those associated with resettlement. The chapter concludes with recommendations related to resettlement and future research.

1.5 Summary

This chapter has introduced the study. It has provided an overview of Ethiopia's lengthy experience of food insecurity and associated dependence on food aid. It has also traced recent government-supported efforts to improve national food security through resettlement. The chapter outlined the aims and objective of the study profiling its focus on investigating the sources of livelihood and effectiveness of adaptation strategy by resettled households in Metema. The chapter also outlined several important limitations to the research. These included the difficulties in accessing accurate secondary information on resettlement from government sources and the limited availability of literature related to voluntary resettlement. It also outlined the overall organisation of the thesis.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter seeks to develop the theoretical paradigm of the research. It provides a critical discussion of concepts of disaster risk; these include vulnerability, hazard, resilience and resistance. The notion of risk and its emergence as an organising construct are then explored in some detail. A discussion of the conceptual models of vulnerability is then presented with particular emphasis on Blaikie et al. (1994), the Pressure and Release (PAR) model and Pelling's Human Vulnerability model. The relation between livelihoods and vulnerability and the sustainable livelihoods framework as an analytical framework is discussed. This chapter then examines resettlement as an adaptive strategy under conditions of environmental stress and provides a theoretical and empirical review of the risks and vulnerability associated with resettlement. The chapter then provides a conclusion on the issues discussed.

2.2 Origins and Emergence of Disaster Risk

2.2.1 Overview

The emergence of disaster risk as an organising construct has significantly advanced contemporary understanding on disaster and risk management in recent decades. It reflects a convergence of thinking that has progressively integrated both the natural and social sciences and connects antecedent risk conditions with 'realised' risks. Risk events may be experienced as disasters affecting households, communities, cities and even entire countries and regions.

In this conceptualization, disaster risk specifically refers to the probability of harmful consequences or outcomes (such as death, injury, property damage, disrupted lives and livelihoods or environmental damage) resulting from the interaction between natural or human-induced hazards and vulnerable socio-economic or environmental conditions (Benjamin 2008; UNISDR 2004 and 2005). While disaster risk now offers a powerful vehicle for bridging the development and disaster domains, its evolution is marked by several clear stages and paradigms.

2.2.2 The 'natural hazards' or engineering and behavioural paradigms

Several authors (Bankoff et al., 2004; Hewitt 1997; Smith and Petley 2009) have traced the evolution of disaster risk concepts over the past century. One useful description of this progression of thought is proposed by Smith and Petley (2009), who identify four distinct stages.

They describe initial approaches (which lasted until around 1950), such as a preoccupation with engineering, which resulted in the design of large structures to protect human settlements from threats which were seen to be purely natural hazards (Smith and Petley 2009: 5). From 1970, this approach expanded to incorporate notions of human agency in the exacerbation of natural hazards or the 'behavioural paradigm'. Both the engineering and behavioural paradigms view risk and vulnerability from the perspective of physical phenomena (Bankoff et al., 2004), particularly hazards regarding hydro-metrological and technological phenomena such as earthquakes, volcanic eruptions, flooding, cyclones and industrial accidents. The occurrence of these hazard events, in terms of magnitude, frequency, rapidity of onset, and spatial distribution, is taken as the point of departure. This understanding of risk is viewed as a **'natural hazard'** approach (Hewitt 1997) because it focuses primarily on how the adoption of hazard adjustments could reduce the undesirable consequences of a hazard event.

Numerous criticisms of the natural hazards approach to interpretations of disasters were offered in the 1980s and 1990s. Authors such as Smith (1996) argued that, for instance, biophysical processes were not sufficient conditions for understanding the complex dynamics of vulnerability. Similarly, Lambert (1994) noted that the approach neglected both structural factors and human agency both in producing vulnerability and coping/adapting to it. In addition, Hewitt (1997) claimed that this approach overemphasized extreme events while neglecting the root causes and everyday social processes that influence vulnerability.

These concerns were reflected in what Smith and Petley termed as the 'development paradigm' of disaster which came about during the 1970s, largely as a result of work by social scientists with first-hand experiences in developing countries. Manyena (2006: 439) acknowledges primarily Phil O'Keefe, Ken Westgate and Ben Wisner (1976) for profiling the importance of vulnerability in disaster discourses in their paper, 'Taking the Naturalness Out of Natural Disasters'.

This approach placed the importance of human vulnerability as the key driver of disaster-related loss in the forefront. It also profiled the plight of the urban and rural poor, especially those in developing countries, and showed that they bore disproportionate loss and hardship (Holloway 2009). The critical role of social vulnerability as a key driver of risk and hardship was particularly championed by political ecologists such as Blakie et al. (1994), Wisner et al. (2004) and Pelling (2003) as well as in noteworthy contributions by Hewitt (1997).

Contemporary thought on disasters and risks has increasingly recognized the need to integrate considerations of vulnerability as well as external hazards or shocks in explaining disaster events. In other words, disaster is considered as a function of the characteristics and frequency of hazards experienced at a specified location, the nature of the elements at risk (people, infrastructure and economic activities) and their inherent degree of vulnerability or resilience to it (DFID 1999).

2.2.3 Vulnerability in the context of disaster risk

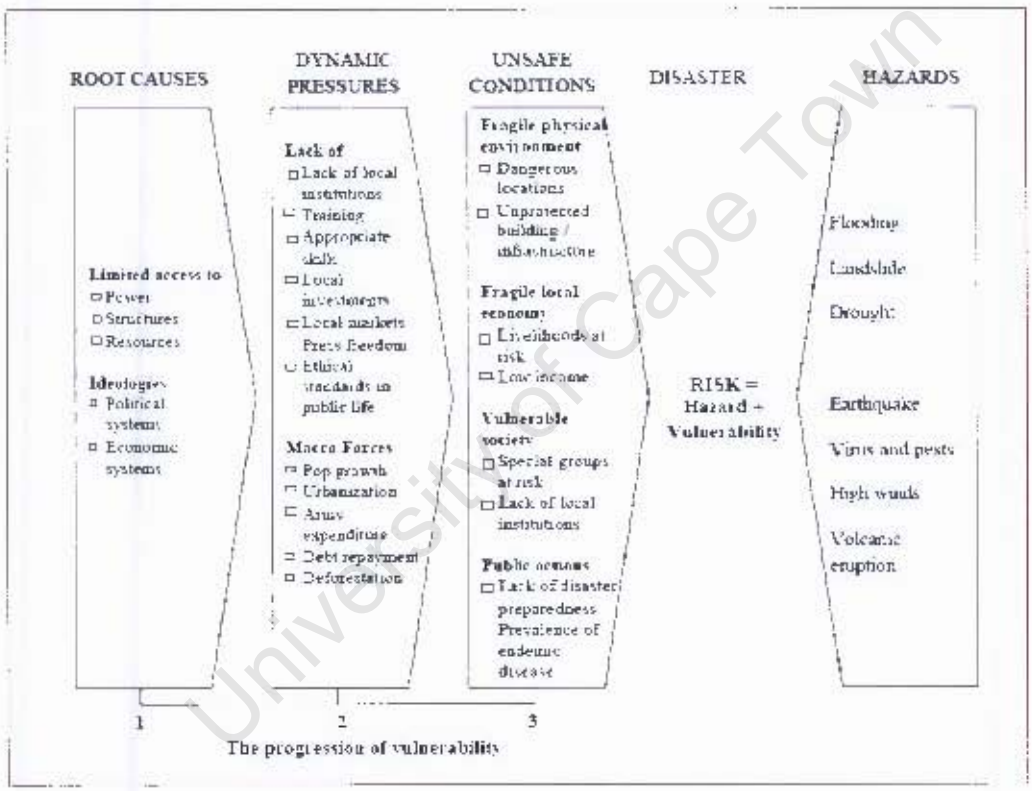
In the context of contemporary approaches to disaster risk, vulnerability has been defined as the inherent 'conditions resulting from physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards' (UNISDR 2004). Despite general agreements about the contributions made by vulnerability, there are significant differences in the conceptual frameworks used to describe vulnerability.

Two of the most influential frameworks in understanding vulnerability in the disaster risk field are the Pressure and Release model (PAR model) which was developed by Blakie et al. (1994) and further elaborated by Wisner et al. (2004), and Pelling's (2003) human vulnerability framework.

Wisner et al. (2004: 11) interpret vulnerability as 'the characteristics of an individual, population or organization and their situation that influences their capacity to anticipate, cope with, resist and recover from the impacts of hazards'. The basis of the framework is that a disaster is the joint result of two opposing forces, those that generate vulnerability on the one side, and the hazard event on the other side. In the PAR model, Wisner et al. (2004) conceptualize vulnerability as the outcome of a progression from ***root causes*** (which are economic, demographic, environmental and political processes that affect the use and distribution of power in society, for example: power, structures and resources, which may ultimately be quite remote from the disaster event) through to processes and activities that transform

the effects of root causes into unsafe conditions called ***dynamic pressures*** (for example: rapid urbanization, population change and rural/urban migration). According to Wisner et al. (2004) ***unsafe conditions*** are the ways in which the vulnerability of an individual or group of people is expressed in time and space in combination with a hazard (for example: living in dangerous locations, low income levels, engaging in dangerous livelihoods or livelihood at risk, poor health, lack of disaster preparedness). Figure 1 shows the range of factors that influence the process of vulnerability in the PAR model.

Figure 1: The Pressure and Release (PAR) Model



Source: Wisner et al. (2004: 51)

Pelling (2003), whose work focuses on urban environmental risk, differentiates vulnerability into three components: **exposure, resistance and resilience.** According to Pelling (2003), ***exposure*** is largely a product of physical location and the character of the surrounding man-made and natural environments. The exposure component can be reduced through hazard mitigation methods employed by individuals

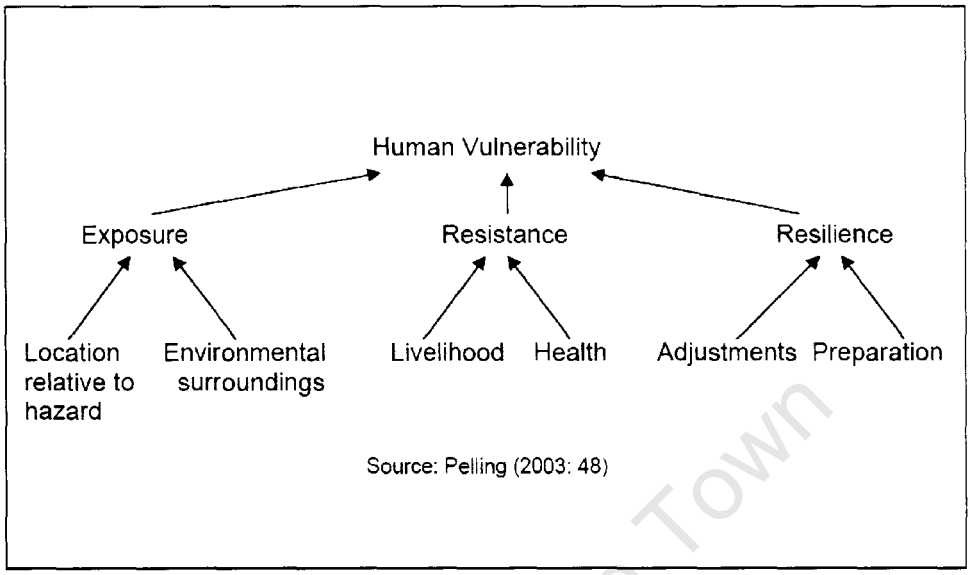
or single households or collectively through public–private social investment policy schemes, such as by establishing strict seismic design codes for public buildings.

Resistance reflects economic, psychological and physical health and their systems of maintenance, and represents the capacity of an individual or group of people to withstand the impact of a hazard. It is highly correlated with the asset potentials of individuals or households. If resistance is low, even a small hazard stress can result in the failure of a system.

Resilience is viewed as the ability of an actor to cope with, or adapt to, hazard stress. It is a product of the degree of preparation undertaken in light of a potential hazard, and of spontaneous or premeditated adjustments made in response to a hazard, including relief and rescue. The most important policy options available to boost resilience are those that shape formal or informal insurance mechanisms (Pelling 2003).

Pelling (2003) further clarifies that all the components of vulnerability are shaped by access to rights, resources and assets, therefore attributing household vulnerability as an outcome of cycles of resource accumulation and expenditure. This conceptualization states that household access to sufficient resources to maintain its members and offer sufficient buffering to prevent or absorb disaster losses is determined by a household's access to assets and the decisions that are made about their use. Assets which affect coping ability tend to be less common when vulnerability is already high, resulting in the 'ratchet' effects of vulnerability. In this context, economic vulnerability increases exposure to losses from disaster shocks, and with each new hazardous event those impacted become more vulnerable to future events. Pelling identified savings, material possessions and tools, labour and the dwelling as important productive assets in urban areas.

Figure 2: Pelling's Human Vulnerability Framework



Both the PAR model and the Human Vulnerability Framework illustrate the diversity of interpretations associated with disaster vulnerability. Manyena (2006) discusses this in-depth. He identifies 20 different interpretations of vulnerability in the context of external shocks and hazards; in which some definitions view vulnerability as an outcome and others as a process. He also foregrounds the general consensus that vulnerability to disaster is 'determined not simply by a lack of wealth but rather a complex range of physical, economic, political and social factors or the predisposition of a community to damage by a destabilizing phenomenon involving independent natural hazard and anthropogenic pressures' (Manyena 2006: 440).

2.2.4 Vulnerability in relation to external shocks and stresses

An inherent attribute of prevailing approaches to disaster vulnerability, however, is the recognition of external shocks and stresses. For instance, as Adger (2006) points out, key parameters of vulnerability are the stresses or shocks to which a system is exposed, the sensitivity of the system and the adaptive capacity of the system[1].

[1] In this context, "system" represents household, community, group, sector, region, country and the globe which people live in.

In this context, he defines vulnerability as 'the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt'. His underlying premise is that shocks or stresses, combined with household, community or system responses (i.e. the sensitivity and adaptive capacity of the system) determine the outcome (i.e. the degree of vulnerability of households and the community).

In this conceptualization, *shocks* include human health shocks (e.g., epidemics), natural shocks (e.g., natural hazard-induced disasters), economic shocks (e.g., rapid changes in prices or exchange rates), conflict, crop failure, livestock health problems and other such disruptions which have an impact on human life (DFID 2000). In contrast, *stresses* are viewed as either long-term trends or a continuous, slowly-increasing pressure within the system that undermines the livelihood potential of households. An example of this would be soil degradation in a rural context (DFID 2000).

Conversely, adaptive capacity refers to 'the ability or capacity of a system to modify or change its characteristics so as to cope with shocks or stresses' (Brooks 2003). This is significantly determined by the livelihood resources available to mobilize in the face of shocks as well as the various policy paradigms, both economic and governance-related, that are embodied in the society's institutional frameworks (Heitzmann et al., 2002; Smit &Wandel 2006).

2.3 Livelihood and Vulnerability

2.3.1 Introduction to livelihoods

Implicit in the conceptualization of disaster vulnerability is a preoccupation with a household or community's capacity to anticipate, resist and recover from the impact of external shocks and stresses. This acknowledges the role that household assets play in mediating exposure and adaptation to external threats as well as the contribution of different livelihood profiles to a range of natural and other threats.

Approaches to understanding livelihoods originated in the 1980s development arena as alternative strategies to poverty alleviation. They particularly highlighted the active role played by the poor themselves in providing for their own sustenance, in contrast to earlier views that defined poor people as passive victims (Jaspars et al., 2007).

Current livelihoods approaches draw significantly from the work of Chambers and Conway in the 1980s and 1990s, in which they developed the idea of 'sustainable livelihoods' with the intention of enhancing the efficiency of development cooperation (Kollmair and Gamper 2002). This is reflected in their original definition:

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stresses and shocks, maintain and enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation and which contributes net benefits to other livelihoods at the local and global levels for the long and short term. (Chambers and Conway 1992: 7)

Their concepts constitute the basics for the Sustainable Livelihoods Approach (SLA), as it was developed by the British Department for International Development (DFID); and subsequently modified, resulting in the widely used interpretation below:

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living: a livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future while not undermining the natural resource base. (DFID 1999)

The core of the sustainable livelihoods approach is people and their livelihoods. As Ellis (2003) noted, the term 'livelihood' attempts to capture not just what people do in order to make a living. It also refers to the resources that provide them with the capability to build a satisfactory living as well as the risk factors that they must consider in managing their resources and the institutional and policy context that either helps or hinders them in their pursuit of a viable or improving living.

2.3.2 Key elements of livelihoods approaches as a conceptual framework

There are numerous interpretations of the sustainable livelihoods approach (De Satgé et al., 2002). However, most livelihoods perspectives emphasize the importance of livelihood assets, strategies and outcomes as well as the enabling/constraining roles of policies, institutions and processes. Some also profile the vulnerability context that applies to the community under consideration.

Livelihood assets

The range and diversity of household strengths in terms of assets or capital is a central component of most livelihoods approaches. It recognizes that access to and ownership of livelihood assets may significantly affect household levels of vulnerability in relation to external shocks. Household vulnerability can be compromised by internal resources (i.e an incapacity to avoid danger/risk) as well as increased exposure to external shocks and stresses to which an individual or household is subjected (Shahbaz 2008). In this conception according to Moser (1998:3) in understanding vulnerability one needs to identify:

Not only the threat but also the 'resilience' or responsiveness in exploiting opportunities, and in resisting or recovering from the negative effects of a changing environment. The means of resistance are the assets and entitlements that individuals, households, or communities can mobilize and manage in the face of hardship. Vulnerability is therefore closely linked to asset ownership. The more assets people have, the less vulnerable they are, and the greater the erosion of people's assets, the greater their insecurity.

The livelihoods framework developed by DFID divides assets into five groupings – human, financial, social, physical, and natural – and this is often displayed as a pentagon. The asset pentagon shown in Figure 3 comprises the five forms of capital, which are described as follows:

Human Capital represents the skills, knowledge, ability to work and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives (DFID 1999).

Financial Capital refers to the financial resources that people use to achieve their livelihood objectives (savings, remittances, pensions and other transfers from the state), and includes flows as well as stocks (DFID 1999).

Natural Capital refers to the natural resource stocks, such as land, from which resources flow and services useful for livelihoods are derived (DFID 1999).

Physical Capital includes housing, household tools and furnishings, clothing, radios, bicycles, jewellery and other items, and the basic infrastructure that enables the pursuit of a livelihood (DFID 1999).

Social Capital refers to the social networks, organizations and relationships of trust and reciprocity within and between families as well as within social networks and communities, and the support provided by religious, cultural and informal organizations (de Satgē 2002).

Livelihood strategies

The range and combination of activities and choices that individuals or households carry out to achieve their livelihood goals are called 'livelihood strategies'. Generally, livelihood strategies are categorized into three types: agricultural intensification/extensification, livelihood diversification, including both paid employment and rural enterprises, and migration, in that people might move away and seek a livelihood source elsewhere, either temporarily or permanently (Scoones 1998).

Individuals and households combine livelihood activities from the whole range of possibilities open to them and do not restrict themselves to an individual sector. This is so that they can meet their various needs at different times and on different geographical or economical levels (Scoones 1998). These strategies are directly dependent on asset status and are further influenced by transforming structures and processes at local, national and international levels. A changing asset status may further or hinder other strategies depending on the policies and institutions at work. Hence, the livelihood strategies that people choose have to be understood as a dynamic process (Kollmair and Gamper 2002). Therefore, extricating the connections between such complex and dynamic processes and the outcomes of different strategy combinations should be a key part of any investigation of sustainable livelihoods (Kollmair and Gamper 2002).

Livelihood outcomes

Livelihood outcomes are the results of livelihood strategies, such as greater sustainability of the natural resource base, reduced vulnerability (e.g. better resilience through increase in asset status), increased income, increased well-being (e.g. health status, access to services) and improved food security (Kollmair and Gamper 2002).

Vulnerability Context

Several livelihoods approaches underline the importance of the 'vulnerability context' or external threats over which people have limited or no control (Twigg 2001). These are important factors because they have a direct impact upon people's assets and the livelihood options that are available to them. The vulnerability context comprises trends, shocks, and seasonality, all of which inevitably shape people's livelihood choices (Scoones 1998).

Trends are long-term and usually large scale. They include demographic trends, resource trends, national and international economic trends, trends in governance and technological trends (Twigg 2001). **Shocks** include human health (epidemics), livestock or crop health shocks, economic shocks (rapid changes in exchange rates), natural hazards (like floods or earthquakes), and conflicts in form of national or international wars (Twigg 2001). **Seasonality** refers to conditions furthest from household's control. This refers to seasonal shifts in prices, production, food availability and employment opportunities (Twigg 2001).

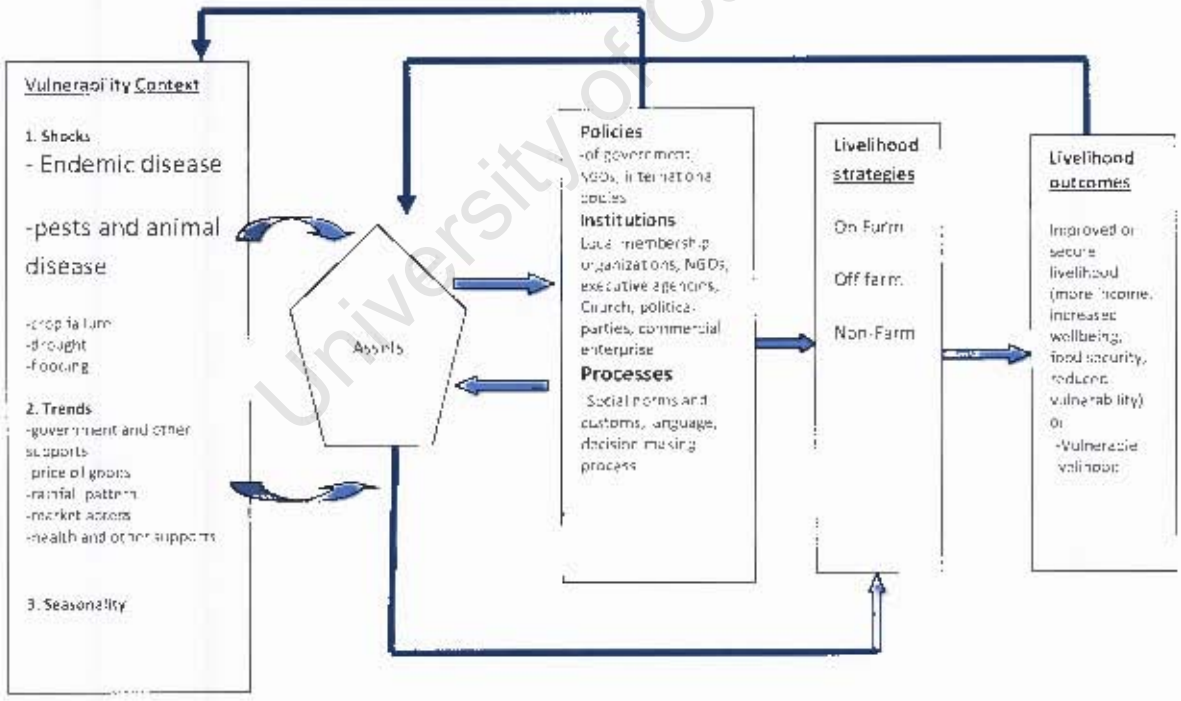
Policies, institutions and processes

Sustainable livelihoods approaches also recognise both the enabling and constraining roles of government policies, institutions and processes. They acknowledge that the social and political context in which people live and the livelihood strategies and livelihood options available to them are shaped by the structures formed by institutions, organizations, policies and legislation (Kollmair and Gamper 2002). These include not only formal organizations and laws but also informal structures, including cultural codes of conduct. These structures operate at all levels, from within the household and local community to the international level, and all individuals and households live within, shape and are shaped by a set of informal and formal practices, norms and rules that constitute the institutional environment (Kollmair and Gamper 2002). They effectively determine access to, and terms of exchange between different types of capital, and any returns to a livelihood strategy either enables or hinders the livelihood strategy, thereby generating or reducing vulnerabilities. Hence, consideration of this institutional and policy context is vital when analyzing vulnerability (Kollmair and Gamper 2002).

2.3.3 Interpretation of the livelihoods approach

The sustainable livelihoods approach has been widely applied across contexts and organizations. It has also been interpreted and applied differently by organizations and agencies. For instance, De Satgé (2002) describes six different livelihoods frameworks, including those developed for use by DFID, CARE, OXFAM and UNDP. One of the most widely used frameworks for understanding livelihoods is that developed by DFID. It places importance on the vulnerability context of households and their livelihood outcomes in relation to the assets of vulnerable people and their links with institutions, policies and processes. The framework presented in Figure 3 encompasses the *vulnerability context* in which people live their lives (shocks, stresses, seasonality) and the different *assets* they possess. The framework also presents the different *livelihood strategies* that households employ and the *policies, institutions and processes* that shape both the strategies a household pursue and the *livelihood outcomes* they attain (Twigg 2001 and Lautze et al., 2003).

Figure 3: The sustainable livelihood framework



Source: Adapted from DFID 1999

2.3.4 Criticisms of the livelihood framework

Despite its widespread use, the sustainable livelihood framework has also been criticised for several key shortcomings (De Satgé et. Al, 2003). Firstly, the framework underplays elements of the vulnerability context, such as rampant inflation and other macroeconomic trends, and extreme civil conflicts, in shaping or affecting people's livelihoods and lives. Secondly, the framework focuses only on encouraging the poor to use what they have in a better way, implying that people's asset pentagons can be expanded in a generalised and incremental fashion. However, improvements in the livelihoods and asset possessions of an individual household cannot be seen as totally separate from the development of the broader community. Thirdly, the emphasis on assets and capabilities means that the framework does not pay enough attention to inequalities of power and conflicts of interest between people. In reality, different people have different power relations according to socio-political structures at different levels, and these have an impact in shaping the lives of the poor, in addition to any asset holdings and household capabilities they may have. Similarly, the framework underplays the fact that enhancing the livelihoods of one group can undermine those of another. In addition, different assets have different values and importance in the livelihoods of households.

2.4 Food Security and Livelihoods

2.4.1 Overview of key concepts

The links between the robustness of household livelihoods and household food security are explicitly underlined by current and widely used definitions of food security. A definition advanced by FAO following the 1996 World Food Summit states that 'food security exists when all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (Thomson 2001: 24). In this context, food insecurity exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level (Thomson 2001).

This definition integrates three elements of food security: availability, access and stability. *Availability* refers to the physical presence of food at various levels from household to national level either from

own production or through markets. It addresses the supply side of food security (Lovendal and Knowles 2006). *Access* refers to the ability to obtain an appropriate and nutritious diet and is particularly linked to resources at the household level. *Stability* refers to the availability of secure access to enough food currently as well as in the future or at different points in time (Lovendal and Knowles 2006). Even if an individual's food intake is adequate for today, he/she is still considered to be food insecure if he/she has inadequate access to food on a periodic basis, as it causes deterioration in nutritional status (Lovendal and Knowles 2006). Generally, the contemporary view argues that food insecurity is not mainly derived from a decline in food availability internationally or nationally but it is primarily because of failure of household's access to food. Similarly, they emphasize its link to poverty or failure of entitlements, rather than inadequate food production (Thomson 2001: 24). Within this perspective, food security analysts have defined two general types of food insecurity: chronic food insecurity and transitory food insecurity.

Chronic food insecurity refers to 'a persistent inability to access adequate food and nutritional intake' (Maxwell et al., 2008: 55), whereas transitory food insecurity occurs when a household faces a sudden drop in the ability to access enough food to maintain a good nutritional status for a shorter duration (Maxwell et al., 2008; Maxwell & Smith ND). Chronic food insecurity is strongly associated with extended periods of poverty, an inappropriate political environment, a lack of assets and inadequate access to productive or financial resources (Maxwell et al., 2008; Maxwell & Smith ND). These are underlying causes which need long term development interventions in livelihood protection or rehabilitation. However, as Maxwell et al. (2008) noted, such interventions are underfunded, even though these activities were being discussed in the 1980s and 1990s. This is because chronic food insecurity cannot be clearly defined in time or linked to a specific cause (Maxwell et al., 2008).

On the other hand, transitory food insecurity can be linked to identified causal factors, such as short-term shocks, fluctuations in food availability and food access (including year-to-year variations in domestic food production), adverse price movements and seasonal income fluctuations (Maxwell et al., 2008; Maxwell & Smith ND). Hence, transitory food insecurity has always received more attention from the government and from donors, and usually greater levels of resources are allocated when households face transitory food insecurity. This does not solve the problems of chronic food insecurity, though the latter is a more serious problem in terms of scale and severity (Maxwell et al., 2008).

However, one should note that chronic and transitory food insecurity are closely linked in that successive exposure to temporary stress may increase the vulnerability of a household to chronic food insecurity, by causing households to liquidate assets in their efforts to stabilize food consumption. Equally, transitory food insecurity will be found where poverty and vulnerability exist (Maxwell and Smith ND).

2.4.2 Livelihoods and food insecurity: Focus on resilience and sensitivity

In recent decades, resilience, sensitivity and sustainability have been given increasing emphasis in household food security literature. The literature has particularly focused on the food security strategies of poor people in the context of their complex and dynamic livelihood strategies. The emphasis is also reflected in the use of the sustainable livelihood framework by numerous development agencies and governments as a tool for assessing poverty and the food security status of households at different administrative levels. Thomson (2001) explains that the Sustainable Livelihoods (SL) framework provides an alternative way to analyze food security issues and looks at household food security both in its vulnerability context and in relationship to policy decisions. Ellis (2003) also emphasizes that the livelihoods approach originates from literature on food security and famine, especially from Amartya Sen's work on entitlements (1981).

In its application to problems of household food insecurity, the sustainable livelihoods framework links the various assets of an individual household (human, social, natural, physical and financial capital), through various policies, institutions and processes. These in turn affect the returns to those assets, and the choices that are available to the household as a result of their livelihood strategies. This generates specific livelihood outcomes, one of which is defined in terms of household food security.

2.5 Resettlement as Adaptive Strategy under Conditions of Environmental Stress

2.5.1 Concepts and definitions

The concept of resettlement is often blurred with the concept of displacement. However, the two concepts are different. *Displacement* refers to the general phenomenon of movement of people from

original areas to another areas due to various reasons, either in a planned way (voluntarily or involuntarily) or spontaneously (Cernea and McDowell 2000), whereas *resettlement* refers to the movement of people from original areas to other areas in a planned and controlled manner.

In this context, displacement refers more broadly to the movement of people which includes either planned movement through government assistance, or spontaneous movement (i.e when people resettle to a new place through their own initiative). For instance, the spontaneous movement of people includes *internally displaced people* (IDPs) and *refugees*. Those who are forced to flee from their home areas to other areas within their own country (i.e who do not cross an international border) in the face of civil conflict, natural or economic disasters, or other threats are considered *internally displaced persons* (Hines and Balletto 2002). Those fleeing from one state into the territory of other states in the face of civil conflict, natural or economic disasters, or other threats, are considered *refugees* (Hines and Balletto 2002).

On the other hand, as Chambers (1969) stated, 'resettlement is characterized by two main features: a movement of population; and an element of planning and control' (Chambers 1969 as cited in Pankhurst 1992).

Large-scale *government sponsored or planned resettlement* programs are undertaken for different reasons: to prevent (or in response to) disaster events, to move people from disaster-prone areas or areas where natural resources have been depleted (environmentally-induced resettlement) or to address economic, social and ecological issues (developmentally-induced resettlement) and provision of land for the landless. In addition, some resettlement programmes are motivated by unofficial political objectives such as to strengthen border defences or to enforce collectivization on larger scale (Erlichman 2003; Yntiso 2009).

Environmentally-induced migrants are understood to be those individuals, communities and societies who choose to, or are forced to, migrate as a result of damaging environmental and climatic factors (Couldrey and Herson 2008). They include those who are forced to flee disasters such as flooding as well as impoverished farmers leaving degraded land and migrating to other areas where they believe agriculture will be more viable. Poverty, failing ecosystems, vulnerability to natural hazards and gradual climate-driven environmental changes are all linked to environmentally-induced migration.

2.5.2 Resettlement as adaptive livelihood strategy

There is a large body of literature that indicates that human populations have used migration[2] as an adaptive strategy to adverse environmental conditions, i.e. when people can no longer gain a secure livelihood in their homelands and have no other alternatives (Gemenne et al., ND, de Haan 2000, Mcleman & Smit 2006). The sustainable livelihood and development literature also identifies migration as one of the three main livelihood strategies of poor rural households that incorporates *agricultural intensification* and *livelihood diversification,* especially in developing countries in Africa and South Asia (McDowell and de Haan ND).

This underlines rising concern that baseline rates of migration will increase in the next 40 years due to climate change and associated environmental and economic stresses, mainly within developing countries (Barnett and Webber 2009). These environmental changes undermine the contributions of natural capital (land) to livelihoods where alternative sources of food and income are not available. This motivates people to move to other areas which are perceived to offer better opportunities.

The environmental stresses which lead households to adopt migration as an adaptive strategy can take many forms: vicious or slow-onset, natural or man-made, due to a single or cumulative changes, etc. Increases in the frequency and intensity of sudden-onset extreme events may lead to larger numbers of people being temporarily displaced. Slow-onset changes may aggravate permanent moves (Barnett and Webber 2009).

The International Organization for Migration (1992) as cited in Barnett and Webber (2009), has classified these stresses into six categories:

- environmental disruptions prompted by climatic or geological forces which include cyclones, volcanoes, earthquakes, floods and other natural disasters
- biological disruptions initiated by pathogens, insects (mainly locusts), pests and flora, which cause major population movements, particularly where they affect production of a staple food item

[2] As cited in Fosse (2006), Skeldon (2002) defines migration as "all forms of human population movement (2002:1)". According to Skelton migration can be divided into a list of sub groups, for example international or internal, long-term or short-term, circular and seasonal, labour migration, voluntary or involuntary and refugees. With this conceptualization resettlement can be considered as one form of migration. However, in this study the researcher focuses on government sponsored resettlement

- slow-onset disruptions which include global warming effects, deforestation, land degradation, erosion and salinity and may contribute to drought and famine
- accidental disruptions, an inevitable by-product of the industrial revolution
- disruption caused by development programmes such as dams or by environmental policies and urbanization
- environmental warfare i.e. when the environment becomes a major target in times of conflict

In their policy brief to the Secretariat of the Swedish Commission on Climate Change and Development and the World Bank World Development Report 2010 team, Barnett and Webber (2009) argued that migration is a tried and true development strategy, and it can do much to increase the capacity of communities to adapt to the stresses mainly associated with climate change. Furthermore, they explained that many of the most calamitous risks arising from this increased mobility can be managed through aid, development, and migration policies.

In recent decades, research in Africa, Asia and the Pacific shows that populations in rural areas have adapted different strategies to cope with recurring drought or other extreme events, and this includes migration.

For instance, Mahmood (1995) showed that people permanently migrated in response to river bank erosion in Bangladesh. Similarly, Parry (2006) described how residents from Carterets Island in Papua New Guinea have relocated in response to coastal erosion while Charnley (1997) stated how people from southern Tanzania have moved in response to land degradation. In rural areas in northern Ethiopia, migration is also undertaken by families during times of drought after other measures, such as reducing food consumption and selling off possessions, have been exhausted (Meze-Hausken 2000). During the large-scale famines of the 1980s, migration was an adaptation taken by a considerable number of households in northern Ethiopia (Ezra, 2001b).

In his case study of five rural sites in Ethiopia, Tadele (2006) also concluded that poverty could be worsened if migration opportunities did not exist in all the studied rural sites. The presence of seasonal and permanent migration from rural to urban areas mostly served as a safety net mechanism for poor individuals and rural households to earn cash income and transfer remittances used for coping with distress situations, paying annual land taxes, buying small stocks and obtaining better healthcare (Tadele 2006).

In addition to these spontaneous movements as a coping strategy, the governments of some countries, including Ethiopia, consider planned population resettlement to be a strategy to alleviate problems of production failure in highly degraded areas, and to support national poverty reduction measures.

2.5.3 Risks associated with resettlement

While resettlement has been identified as one of the three explicit strategies to alleviate the problems of food insecurity in Ethiopia (more detail in the next chapter), studies carried out by many institutions and individuals have indicated that government-sponsored resettlement schemes have often failed to achieve their intended objectives. Rather than improving the livelihoods of the resettled, these schemes have reportedly increased the risk of impoverishment (Pankhurst 1992; Abutte 2000).

This is consistent with findings from numerous studies. These emphasise that that relocation often involves a number of complex interactions that make households' livelihood reconstruction in the new area difficult (Tadese ND; Ota 2001; Downing 2002). The literature on resettlement has identified different risks, especially for those who have been resettled involuntarily through government sponsored schemes, although the intensity and the nature of the consequences reportedly vary from programme to programme. Resettlement results in a range of different stressors of a physiological, psychological, cultural, environmental and socioeconomic nature. Stress also results from households struggling to ensure their basic survival (Tadese ND; Ota 2001; Downing 2002). As Good (1996) points out, resettlement can result in anger, bitterness, loss and grieving and in the breakdown of family and community networks. Furthermore, he explains that the land given to the resettled and the attendant changes in agricultural practices required of them are often at odds with the farming knowledge and lifestyle they were accustomed to in their original areas.

In this regard, there are two theoretical arguments as to why resettlement often fails to improve the conditions of the resettled and exposes them to different stressors; the *inherent complexity* approach developed by Chris De Wet (De Wet, 2009) and Impoverishment Risk and Reconstruction (IRR) model developed by Michael Cernea (2000) which De Wet (2009) characterize it as "*the inadequate input* approach".

The inherent complexity approach

The *inherent complexity* approach argues that there is complexity in resettlement which arises from the interrelatedness of a range of factors at different levels, such as cultural, social, environmental, economic, institutional and political, all of which are taking place in the context of imposed spatial change, the influence of internal decisions and external power, and mutual transformation. This complexity renders resettlement outcomes difficult to predict (De Wet, 2009). According to De Wet, 'understanding this complexity and attempting to come to terms with it, seems to require a more comprehensive and open-ended participatory approach than the predominantly economic and technical perspective which characterizes the inadequate input approach' (De Wet, 2009: 43).

The *inherent complexity* approach identifies five main characteristics or features that make involuntary resettlement a complex process (De Wet 2009: 38-40).

Firstly, resettlement does not only physically displace people; it also has cultural, environmental, social, economic and political implications for the people involved. Furthermore, it is argued that the emotional attachment that people can feel to the villages and land that their families have lived on for generations cannot be replicated in the resettlement areas because of the social disruptions involved in relocation (De Wet 2009).

Secondly, resettlement very often involves a change in the pattern of peoples' access to resources as well as a change in livelihood strategies. Specifically, such change occurs in patterns of land use, land tenure, access to grazing land in rural areas; and high transport costs and higher prices in urban areas because as they usually resettled far away from market or work places (De Wet 2009).

Thirdly, resettled people find themselves culturally, ethnically and religiously in larger and more heterogeneous settlements than before as they are drawn from many parts of the country. This makes the competition for resources greater and livelihood adaptations more difficult (De Wet 2009).

Fourth, it involves people in wider social, economic and administrative structures and this might cause a lessening of the political, social and economic autonomy of the resettled people. This is because often there are various stakeholders involved in government-sponsored resettlement schemes, such as the

relevant government departments and aid agencies, each with their different objectives and motives (De Wet 2009).

Lastly, resettlement involves accelerated socio-economic changes that may be beyond the affected people's capacity to cope. Often it involves disruptions in the local means of livelihood and a change in agricultural practices (De Wet 2009).

The *inherent complexity* approach contends that these varied characteristics of involuntary resettlement, combined with a number of factors at the level of the resettlement project as an institutional process, make resettlement a complex process and leave the resettled people impoverished or unable to restore their former standards of living, and most often socioeconomically worse off than before.

De Wet (2009) further note that the institutional processes that undermine the realization of intended goals of resettlement projects, and that lead to the threat of impoverishment to the resettled, are: poor policy practices that are usually characterized by poor communication and coordination between the various agencies; a critical shortage of resources which are mutually reinforcing, such as money, staff, skills and time; the error of considering resettlement as mainly an external cost rather than main part of the development project, so that usually a small percentage of the budget of the overall project is allocated for the resettlement process; a lack of proper consultation with and the inadequate participation of the relocated people; the lack of proper plans regarding resettlement schemes; limited proper legal and policy framework at national levels; and a lack of sufficient political will and commitment (De Wet 2009:40-41).

De Wet (2009) cites the threats (imminent harm, danger or misery) that may occur at various levels of resettlement: individual/household, community level, project level, regional/national and international. The threats he identified at individual/household level and community level, are summarized as follows:

At individual or household level, there is a loss of access to services, loss of access to schooling, loss of civil human rights. At community level, the danger or threats that could be encountered include the disruption of the existing social fabric i.e. the culture and patterns of social organization and interpersonal, kinship groups and informal networks. These are consistent with what Cernea called 'social disarticulation' (Cernea 2000). Moreover, the loss or lessening of access to communal property resources, community services and schooling could happen at community level. De Wet emphasizes,

however, that different groups of the resettled (including rich and poor, young and old, men and women, healthy and ill) will experience the threats inherent in resettlement with different intensities. In addition, the institutional context at the new sites might be different and the resettled might have less political power, and this may negatively affect their ability to negotiate access to resources (De Wet, 2009).

The Impoverishment Risks and Reconstruction approach

An alternative view is proposed in Michael Cernea's Impoverishment Risks and Reconstruction (IRR) model, which is also called the *inadequate inputs* approach (De Wet 2009). Cernea (2000) argues that very often the displaced face various risks and need to adapt to ecological, social, economic and cultural situations with which they are unfamiliar. Accordingly, these altered circumstances render livelihood adaptations difficult and lead to severe impoverishment for the resettled community if appropriate counteraction is not initiated.

In his IRR model, Cernea identified approximately eight key potential socioeconomic risks that accompany displacement and to which planners and development practitioners need to give attention. These risks are unemployment, homelessness, landlessness, marginalisation, food insecurity, loss of access to common property, erosion of health status, social disarticulation and lack of access to education (Cernea 2000).

Landlessness: land is the most important asset on which many people, especially in rural areas, build their livelihoods. In resettlement programmes, people very often lose their land or are given small plots of marginal land without appropriate compensation. If this happens, the resettled people lose their main source of livelihood and income.

Joblessness: as the resettled households are unfamiliar with the economies and production systems of the new area, or because they have lost the use of private as well as common assets (land, industry, places of business and customers etc), the risk of being unemployed is very high. Substantial investment is required to create new job opportunities in a recently-established community and to train people to familiarize themselves with the new production systems (Cernea ND).

Homelessness: the loss of a home or shelter is normally only temporary for many of the displaced. However, as re-settlers often cannot afford the labour and financial costs of rebuilding a house quickly, there will be deterioration in their housing standards and they are usually forced to live in temporary shelters for the initial years of resettlement (Cernea 2000).

Marginalization: this usually occurs when households lose economic power and fall into a lower socioeconomic category than that which they occupied in their home areas. According to Cernea (2000: 26), such socioeconomic marginalization eventually results in a loss of self-esteem.

Food Insecurity: the forced removal of a community often increases the risk that people will be temporarily or chronically undernourished. This is because rebuilding regular food production capacity at the relocation site may take years, as people are relocated to environments where their productive skills may be less applicable, and it takes some time to adapt these productive skills to the new area (Cernea 2000).

Increased Morbidity and Mortality: massive population displacement increases vulnerability to illness and causes serious declines in health levels due to the change in the environment and the unavailability of appropriate health services. Vulnerability to illness also results from an unsafe and insufficient water supply and poor sewage systems that spread epidemic infections such as diarrhoea, dysentery and other waterborne diseases. Moreover, displacement-induced social stress and psychological trauma are sometimes accompanied by the outbreak of relocation-related illnesses, particularly parasitic and vector born diseases such as tuberculosis and schistosomiasis. Infants, children and the elderly are affected disproportionately (Cernea 2000).

Loss of Access to Common Property and Services: Cernea has observed that for poor people, particularly for the landless and asset-less, the loss of access to common property assets such as grazing land, forested land, water bodies, burial grounds, quarries, etc, results in significant deterioration in income and livelihood levels.

Social Disarticulation: the displacement of people often disrupts their social organisation, as well as informal and formal networks, associations, kinship ties and general socio-cultural foundations which have been built over generations. This is because the displaced people of one village are very often distributed into a number of relocation places. Thus, one resettlement site might consist of people belonging to many castes, from different villages and from various clan groups. Due to this

heterogeneous nature of the resettled population, social disarticulation has taken place in the resettlement sites during the post displacement stage (Cernea 2000).

However, Cernea notes that impoverishment itself should not be considered as inevitable outcome of resettlment. The lives and livelihood of the displaced can be improved, and the above-mentioned impoverishment risks can be mitigated or reduced through the effective implementation of reconstruction plans and more enlightened national and international policies that include development initiatives that target the affected people. According to the inadequate inputs approach, the failure of resettlement programmes simply derives from failure to adhere to effective and efficient frameworks for planning and implementation. More specifically, the failure of a resettlement scheme will tend to result from a lack of the following institutional inputs: national legal frameworks and policies, political will, funding, pre-resettlement surveys, planning, consultation, careful implementation and monitoring (Cernea 2000).

According to this approach resettlement related impoverishment risks can be reduced through targeted risk reversal or mitigation strategies and appropriate financing. Hence, besides identifying and predicting impoverishment risks (which constitute the first part of the model), the IRR model has suggested a second component known as the "reconstruction phase" to avoid failure of resettlement schemes. The logic underlying this aspect of the IRR model is that to prevent and overcome the patterns of impoverishment it is necessary to act timeously to reduce the risks and mitigate them from becoming reality. According to the model, this is possible by reverting and converting the risk pattern (i.e the first part of the model) into a reconstruction pattern strategy. This includes implementing and designing of policies and strategies which could help to address the situation of resettled households as follows: From landlessness to land based resettlement; from joblessness to reemployment; from homelessness to house reconstruction; from disarticulation to community reconstruction; from marginalization to social inclusion; from expropriation to restoration of community assets, from food insecurity to adequate nutrition and from increased morbidity to better health care (Cernea 2000).

2.5.4 Comparison of the inherent complexity and IRR approaches

From the discussions above it is understood that the *inherent complexity* approach has modest expectations of resettlement outcomes outcome from resettlement; i.e according to this approach, resettlement rarely leads to improvements in the quality of life of those who are relocated. This approach views threats associated with resettlement broadly in a comprehensive way going beyond terms of economic and technical rationality to include questions of beliefs and values, social changes as well as cultural and political dimensions. It views the prediction of resettlement outcome as particularly difficult due to the complexities which arise from the interrelatedness of these different factors. The approach also emphasizes the essential role of participation and effective communication at all stages of any development project that will result in relocation, in order to reduce impoverishment risks.

In this regard, the approach is more robust in that it attempts to capture the complexity and changing nature of socio-cultural, environmental, economic, institutional and other unnoticed factors that shape the vulnerability of households to resettlement related risks. Furthermore, the approach unlike the IRR model (which focuses more on institutional constraints), is robust enough in explaining the underlying driving factors that trigger resettlement related risks. Besides, it highlights a historical perspective in terms of the changes in socioeconomic and administrative structures over time that might impacts over the adaptive capacity and vulnerability of resettled households. Moreover, similar to the contemporary understanding of disaster risk science and the livelihood approach, this approach underlies the importance of effective communication and participation and consideration of local knowledge in reducing resettlement related risks. On the other hand, the *IRR approach* is more optimistic. It presumes that the lives and livelihoods of households can be improved if appropriate implementation and reconstruction plans are developed. This approach gives more emphasis to planned institutional measures to alleviate the threats associated with resettlement rather than addressing the underling risk factors and the importance of the involvement of the community. Moreover, the IRR approach focuses on addressing the risks identified rather than the underlying triggering factors to address the problems of impoverishment. However, as indicated by contemporary understanding of disaster risk science and other related literature, these kinds of interventions are of limited effectiveness. Table 1 summarises the two approaches with regard to risk drivers, risk outcomes and possible solutions.

Table 1: A comparison of Inherent complexity and inadequate input approaches

Approach	Main risk drivers	Risk outcomes	Solutions
Inherent Complexity approach	The complexity of the process itself which involves cultural, social, environmental, economic, institutional, and political factors.	Classified under different levels: Household level-loss of access to socioeconomic services, loss of civil human rights; Community level-disruption of culture, social relation and informal networks, loss of access to common property	Participation and effective communication
Impoverishment Risks and Reconstruction approach	Lack of institutional inputs such as national legal frameworks and policies, political will, funding, planning, pre-resettlement survey, poor implementation and monitoring	Unemployment, homelessness, landlessness, marginalisation, food insecurity, loss of access to common property, erosion of health status, social disarticulation and lack of access to education	Effective and efficient plan and institutional measures

2.5.5 The inherent complexity and IRR approaches through the lens of livelihood framework

Although its presentation differs somewhat and it does not profile the concept of livelihood explicitly, the *inherent complexity approach* has incorporated most of the elements of the sustainable livelihoods framework (see Figure 3). The change in price of goods and competition for resources between the resettled and their hosts discussed in this approach, for example, could indicate vulnerability contexts in terms of **trends**. However, the approach does not explicitly state the impact of natural shocks in its analysis.

The inherent complexity approach states that people with different characteristics will experience the threats inherent in resettlement with different intensities. This implicitly indicates the importance of **assets** as a means by which to adapt or cope with threats (for example: rich and poor indicates financial, physical or natural capital; human capital can be represented by whether there are young or old or healthy or ill or men and women in the household).

In addition, the influence of wider social, economic and administrative structures and policies at different levels is explicitly stated in the *inherent complexity* approach as a factor in shaping outcomes in resettlement projects, which coincides with the livelihoods framework's **institutional, policy** and **structural** elements. The approach has also explicitly stated the existence of changes in **livelihood strategies** due to changes in patterns of land use, land tenure and access to communal resources like grazing land.

On the other hand, the *inadequate input* approach explicitly focuses on the policy and institutional elements of the livelihoods framework; and emphasizes identifying the outcomes which are defined as *impoverishment risks;* and assigns all the risks to institutional failures rather than the interplay of the different elements mentioned in the livelihood framework. Furthermore, similar to the *inherent complexity* approach, the *inadequate input* approach does not explicitly state the impact of natural shocks in shaping outcomes.

2.6 Conceptual Approach for the Study

Existing literature on involuntary resettlement underlines the complexity of the challenges and threats that face the relocating households. This study, however, adopts an explicit disaster risk view according to a social-environment perspective within geography. This conceptualization views disaster risks as the outcome of the interplay between external risk drivers (such as weather extremes as well as other household shocks and stresses) and conditions of internal household vulnerability.

The livelihoods approach therefore provides a useful and relevant frame. It specifically allows investigation into the relationship between the respective asset profiles of resettled households and their vulnerability to external shocks. Similarly, it allows for the examination of livelihood strategies that

result in more (or less) favourable livelihood (or 'risk') outcomes, and the institutional factors that that enable or discourage adaptation to the new conditions.

2.7 Summary

The chapter addressed the following areas of literature that have informed the study: the conceptualization of disaster risk; the relation between livelihoods and vulnerability; resettlement as an adaptive strategy in times of environmental stress; and risk concepts in relation to resettlement.

Studies in disaster risk have emphasized a shift from being hazard focused (in that disaster risks can be mitigated through structural mitigation measures) to a concept of disaster risk as a function of both external processes and internal socioeconomic vulnerability. In other words, disaster risk is perceived as an ongoing condition of the society and the environment.

In this conceptualization, the ability of a household's livelihood to be able to cope with and recover from stresses and shocks has become very important when understanding vulnerability to disaster risks. In particular, the sustainable livelihood approach contributed significantly to current understanding of household vulnerability and resilience under difficult conditions.

The resettlement literature provides insights regarding the various threats associated with resettlement as well as the main constraints that undermine the achievements of the programmes' intended or planned objectives. In this regard, two approaches were reviewed.

The *IRR* approach was considered less robust in the context of this research. This focuses on the institutional constraints that resettled households face in improving their wellbeing. Moreover, the resettlement outcomes explained in the model are seen as impoverishment risks. It overlooks socio-economic, demographic, cultural and environmental factors that cannot be addressed by simply allocating adequate funds or other resources.

On the other hand, the *inherent complexity* approach was found to be more relevant to this study as it seeks to include the different factors that undermine the effectiveness of resettlement schemes.

The chapter concluded by conceptually locating this study in the disaster risk domain. It restates the importance of the livelihoods approach in framing and implementing the study.

CHAPTER THREE
RESEARCH CONTEXT

3.1 Introduction

This chapter describes the research context for this study. As mentioned earlier, the history of government-supported resettlement in Ethiopia is inextricably linked to efforts to manage and reduce food insecurity. This is in turn exacerbated by an economy dominated by an increasingly fragile agricultural sector, which is characterised by ever-increasing fragmentation of land and landlessness due to population pressure resulting from Ethiopia's current population distribution patterns. Topography, climatic conditions and 'human-induced' or anthropogenic factors contribute to the Ethiopian experience of famine and food insecurity.

This chapter describes the role of agriculture in the Ethiopian economy as well as the importance of topography and climate in shaping agricultural outcomes and population distribution. It reviews the recent history of government-supported resettlement schemes to address land pressures. The chapter then focuses more specifically on resettlement programmes associated with the 2002/2003 famine and concludes by providing an overview of the study area in Metema resettlement district.

3.2 Agriculture in the Ethiopian Economy

The agricultural sector remains our Achilles heel and source of vulnerability. ... Nonetheless, we remain convinced that agricultural based development remains the only source of hope for Ethiopia. ~ Meles Zenawi, Prime Minister of Ethiopia, April 2000, cited in Devereux (2000)

Ethiopia, with an area of 1.14 million square kilometres, is located in the Horn of Africa, and is bordered by the Sudan in the west, Somalia and Djibouti in the East, Eritrea in the North and Kenya in the South (Ministry of Foreign Affairs ND) (see Figure 4). According to the 2007 census, the total population of the country was approximately 74 million. Ethiopia is one of the world's poorest countries, with indicators suggesting low levels of development and with an estimated per capita income of $130 in 2006 (Austrian Development Cooperation ND).

Figure 4: Maps showing administrative states and the location of Ethiopia in Africa

Source: Designed by Anne Westoby, 2009

Ethiopia is predominantly an agricultural country, so the agricultural sector plays an important role in the national economy, both as a way of life and as the primary source of livelihood. Agriculture's importance in Ethiopia encompasses several roles, including people's primary occupation, contribution to GDP, export earnings and as a source of raw materials for industrial production. Agriculture contributes 45–50% of the GDP and employs about 85% of the population. Moreover, it accounts for more than 80% of exports (Aoenew 2006).

However, the sector is dominated by subsistence production with low productivity; smallholder agriculture accounts for more than 90% of agricultural production and 95% of the total area under

cultivation (Legesse 2000 and Adenew 2006). Furthermore, as different sources show, the sector is characterised by a high dependence on rainfall, the limited use of modern inputs (often farmers use traditional agricultural tools and paired oxen to produce different crops, and there is a limited use of fertilizers), limited market integration and limited irrigation (only 3% of irrigable land as cited in the introduction). Consequently, the sector is vulnerable to rainfall variability and drought.

The most widely-cultivated agricultural products in Ethiopia are teff[3], wheat, barley, cotton, sugar cane, oil seeds, corn, sorghum, millet, vegetables, fruits and coffee. Of these, teff (a species endemic to the Ethiopian highlands) is the most important, accounting for some 80% of the land area in which major crops are cultivated, and over a third of the value of total agricultural production (UNDP 2002; FDRE 2002 as cited in DFID 2004). Although its contribution has decreased in recent years due to global price fluctuations, coffee is still a major export product. Ethiopia has the largest livestock population in Africa, with an estimated 35 million cattle, 39 million sheep and goats and 1 million camels. As such, livestock is also an important source of livelihood (Ziegler 2005). Livestock play a critical role in farming as well as in pastoral communities as a means of production (draught power), transportation, income and employment through sale and barter of live animals, hides and skins, dairy products, eggs and honey and through a range of social and political activities. EC/IGAD (2000), cited in Halderman (2004), reported that livestock contributed about 40% to agricultural GDP or more than 20% of the total GDP.

Furthermore, as the banking and formal insurance system is very poor in Ethiopia, livestock plays an important protective role against risk (i.e. as a coping mechanism), especially in the case of crop failures during drought periods, as well as yielding monetary saving and investment (Halderman 2004). Livestock is also a potential source of foreign exchange earnings in Ethiopia. At present, live animals, chilled and frozen beef, mutton and canned meat are major exports (Lautze et al., 2003). This aspect of the economy is however constrained by the lack of a port, lack of government investment in the livestock sector, poor veterinary services, successive droughts and population pressure on grazing land (Lautze et al., 2003).

Recognising this high dependency on agriculture, and the potential for agricultural development (because of the fact that in Ethiopia, land and labour are relatively cheap but capital is in short supply), the present government of Ethiopia views agriculture as the driving force of the economy and the basis of its economic policy. This is reflected in the government's agriculture-centred development policy

[3] Teff is indigenous to Ethiopia. It is used to bake enjera, the flat bread that is the principal form in which grain is consumed in most parts of the country.

framework called the Agriculture Development Led Industrialization strategy (ADLI) which seeks to ensure rapid and sustainable development (Devereux 2000 and Tesfahun et al., ND).

3.3 Agricultural activities and population distribution in relation to topography and climate

In Ethiopia, agricultural productivity is skewed to its highland zones. It is marked by a considerable topographic diversity, ranging in altitude from the highland mountains of Ras Dejen at 4,620 metres above sea level to the Dankil Depression at 125 metres below sea level, which has the hottest temperatures in the world (Haan et al., 2006). In this context, it is a land of mountains, highlands, the Great Rift Valley and major rivers and lakes, including the Blue Nile, as well as hot lowlands and dry desert regions.

Due to this marked diversity, there is considerable annual variability in rainfall distribution and temperature throughout the country. Rainfall varies from up to 2,000 mm in the high central plateau to less than 100 mm per year in the lowlands, and the mean annual temperature ranges from 10°C in the mountains of the North-Western and South-Eastern highlands to 35°C in the North-Eastern lowlands (UNDP-GEF 2006).

Three agro-climatic zones have been identified: *Dega* (cool zone at an altitude higher than 2,600 metres above sea level), *Woina Dega* (a temperate zone at an altitude between 1,600 and 2,600 metres), and *Kolla* (the hot lowlands below 1,600 metres) (Wakitola, 1999). The spatial and temporal distribution of the rainfall brings three distinct seasons in Ethiopia: the *Bega* (dry season, from October to January); the *Belg* (small rainy season, from February to May); and the *Meher* (long rainy season that extends from June to September) (UNDP-GEF 2006).

Each of the agro-climatic zones supports very different production systems and livelihoods, and these variations exert a strong influence on the distribution of the population. The *Dega* and *Woina Dega* zones contain a large part of the country's land area under cultivation while the dry lowlands and semi arid zones are dominated by livestock production (Wakitola 1999). Teff, wheat and barley are primarily cool-weather crops, generally cultivated at altitudes above 1,500 metres. Sorghum, millet, corn, cotton, peanuts and sesame plantations are cultivated mostly in hot areas at lower altitudes (Wakitola 1999).

The climate of the highlands (≥1500 metres above sea level) is generally pleasant. It has the advantage of being a relatively disease-free environment with little malaria. As a result, the majority of Ethiopians (85% of the total population and 70% of livestock) are concentrated in the highlands. This zone comprises 45% of the country's land area, while the lowlands that cover 55% of the country support only 15% of the population and 30% of the livestock (UNDP-GEF 2006).

It follows that the highlands of the country, which constitute a smaller geographic area than the lowlands, exhibit a high concentration of human population, livestock and cultivated land. Thus, associated with population pressure, centuries of agricultural activities and improper natural resource management, the highland parts of the country, especially in the North (Amhara and Tigray regional states), are highly degraded. This combination of land degradation, a lack of adequate rainfall and other factors often causes crop failures, resulting in poor agricultural performance and low food production in an area where the majority of Ethiopia's people live (Legesse 2000).

Therefore, Ethiopia's agricultural sector has increasingly been unable to perform its most important function of providing adequate food for the rapidly growing population. As a result, the rural poor in the highlands of Ethiopia are disproportionately confronted with food insecurity. On the other hand, however, it is widely reported that the country has a considerable amount of land in the sparsely populated lowlands that is currently under-utilized, yet is suitable for farming. However, it is reported that malaria is a recurrent problem in these areas.

3.4 Ethiopia Resettlement Context: History and Policy Evolution

3.4.1 Resettlement under the imperial regime (1958-1974)

In Ethiopia, the role of government-sponsored resettlement programmes as a strategy for addressing problems of food insecurity, population pressure, landlessness and environmental degradation, has expanded since the early 1960s. Resettlement schemes under the Imperial regime were largely undertaken to promote the following objectives (Pankhurst 1992): firstly, to increase gross agricultural production and thereby raise state revenues by expanding the cultivated land area of the country. Secondly, to relieve population pressure in the northern highlands. Thirdly, as a means of expanding employment opportunities and solving the problem of a growing excess labour force. Fourth, to encourage the diffusion of improved technology in agricultural production (Tadesse ND).

The first planned resettlement programme began in 1958, during the Imperial period (Eshetu and Teshome 1988 as cited in Yntiso 2009). From the Imperial period up to the revolution of 1974, it has been estimated that about 20,000 families were resettled through government-sponsored resettlement schemes from overpopulated and drought-prone areas of the northern highlands to the lowlands of the south (Clarke 1986 as cited in Belay 2004). The settlers were landless peasants, pastoralists and shifting cultivators, urban unemployed and ex-soldiers (Pankhurst 1992). In addition, the number of people who resettled spontaneously has been estimated at over one million between 1950 and 1974. This resulted in cultivated land expanding by 25% in this period (Cernea & Guggenheim 1993).

3.4.2 Planned settlement under the military regime (1974-1991)

During the time of the military government (1974-1991), the country experienced the most devastating famine and the worst economic conditions in its history. Hence, resettlement was considered as a very powerful policy response to alleviate the problems of chronic food insecurity in drought-prone areas of the country and an instrument to alleviate all socioeconomic problems (Belay 2004). Pankhurst (1992: 17) summarized the objectives of the resettlement programme under this regime as follows.

Resettlement continued to be seen as a remedy for all ills and a way of furthering a hotchpotch of economic, social and political objectives for dealing with famine, providing land to the landless, increasing agricultural production, introducing new technologies, establishing cooperatives, removing urban unemployed and 'undesirables', stopping charcoal burning, settling pastoralists, and shifting agriculturalists, forming defenses on the Somali border and rehabilitating repatriated refugees.

As a result, within ten years of the revolution (i.e 1974-1984) about 46,000 households comprising 187, 000 people were resettled on 88 sites (Pankhurst 1992). According to Pankhurst (1992: 17) the reasons for this dramatic increase were: firstly, the land reform in 1975 which nationalized rural land avoided the obstacles of shortage of land to earlier proposals. Secondly, 'two successive nationwide famines within the span of a decade highlighted the need for long-term solutions'. Thirdly, following the 1972/73 famine that claimed the lives of many thousands of people, the Relief and Rehabilitation Commission (RRC) was established and tasked with resettlement schemes in addition to other relief and rehabilitation work.

Of all these crises, the 1984 famine was the most devastating. In response, the military regime launched a large-scale resettlement programme and the academic consensus is that about 600,000 people were resettled between October 1984 and January 1986. The relocation was from drought-affected and over-populated areas, predominantly Wello, Shewa and Tigray, located in the north of the country, to the lowlands of southern and western parts of the country (Ezra 2001a; Yntiso 2009, Pankhurst 1992). With reference to the unpublished reports of the Relief and Rehabilitation Commission, Ezra (1997), as cited in Ezra (2001), has reported that between 1980 and 1990, 343,000 households, or approximately 1.7 million individuals, were resettled in the western and southwestern areas of the country.

However, empirical assessments conducted on the living conditions of the resettled in past schemes have shown that these relocation initiatives did not meet the requirements of a sustainable development project. Furthermore, as shown by many research projects, the programmes failed to meet the intended objectives of food security and achieving better livelihoods for the resettled populations. Rahmato (2003), as cited in Haile (2004:46), sums up the condition as:

Some 33,000 settlers lost their lives due to disease, hunger, and exhaustion and thousands of families were broken up....The program involved considerable environmental damage. Large areas were cleared of their vegetation to build homesteads, to acquire farmlands and to construct access roads. Resettlement in particular failed to recognize the rights of local people or the carrying capacity of the areas of settlement. It created conflict between the host population and settlers. It also failed to adapt farming practices to the agro-ecological conditions of the lowlands, and as a consequence, the environmental damage involved was quite considerable.

3.4.3 Criticisms of past resettlement schemes

The failures of past resettlement programmes were precipitated by inadequate planning, inappropriate settler selections (many people were moved involuntarily), inadequate budgetary support and inexperienced staff (Tadesse ND). In addition, many of the settlement sites were chosen without prior investigation as to their suitability from a cultural, climatic and linguistic perspective, and no attempt was made to settle people from the same areas in the same settlement sites in order to maintain social cohesion. There were no assessments of how many people should be moved and how many people

were willing to move (Pankhurst 1992). The participation of the settlers in the decision making was also non-existent and households were given false information and false promises (Abutte 2000). There was no adequate infrastructure in most of the resettlement sites. It was also reported that there was a high rate of equipment misuse. For instance, Pankhurst (1992) indicated that 10 years after the resettlement only a quarter of tractors were operational. There was high family disintegration (Abutte 2000).

Moreover, there have also been questions about the government's motives behind the resettlement programme. Although the government maintained that the programme was to ensure food security for the famine victims, some saw it as part of a larger political agenda to consolidate power by making the peasants more dependent on the government and to depopulate areas where opposition groups were active (Abutte 2000 and Clay et al., 1988 as cited in Fosse 2006). The main motive was to empty northern rebel niches of potential recruits by forcibly removing the population in the guise of resettlement (Belay 2004); and to control opposition movments in the destination areas (Yntiso 2009). Moreover, it was used in disposing' of urban unemployed who were suspected of being trouble makers, and sedentarizing pastoralists. In addition, resettlement was used against people who were unable to pay taxes, and to 'solve' disputes arising from land re-allocations (Belay 2004). The other argument with respect to the political motives of the resettlement progrmme of the military regime was that it was used to reorganize the peasantry into producers cooperatives and to create agricultural collectivization of the soviet type, so that it enables the government to have control over large segments of society (Yntiso 2009).

Despite all these shortcomings, the present government considers resettlement as one of the three main strategies it will use to overcome the problems of food insecurity. In doing so, it will aim to ensure that certain preconditions are put in place prior to resettlement, something the previous government failed to do. The following section reviews the context for the current resettlement programme.

3.5 Food Insecurity and Current Resettlement Programme

3.5.1 Scale and severity of national food insecurity

In Ethiopia's recent history, the 1984/85 famine, that attracted significant global media attention and international relief, and in which a significant percent of the population and cattle reportedly died, was the most tragic example of this country's vulnerability to famine and food insecurity.

More recently, in the 1990s and 2000s, as World Bank and other sources show, there was not a single year in which the country was able to meet its food needs without any kind of external assistance. According to the World Bank (2003), even in a normal rainfall year, on average about 5-6 million Ethiopians are in a need of some form of assistance to help meet their basic food needs. The number of people in need of support increases significantly in years of below average rainfall.

One illustration of the country's extreme levels of poverty and food insecurity has been Ethiopia's high dependence on foreign aid. Reportedly, Ethiopia is the largest recipient of food aid in the world and foreign aid has become an institutionalised response to food insecurity (Haile 2004). According to the Ethiopian Economic Association (2002), as cited in Haile (2004), foreign aid as a percentage of GDP has grown from less than 1% to about 15% from 1970 to 2000. Furthermore, the amount of food aid as percentage of foreign exchange earnings has grown from about 2% in 1954 to over 40% in 1998 (USAID 1998 as cited in Haile 2004).

In this regard, in terms of both the number of people and land area affected, the 2002/2003 drought is regarded to be the most devastating in the history of Ethiopian famines. During this event, approximately 13 million people needed food assistance to survive because the drought affected the traditionally food surplus-producing areas of SNNPR and several parts of Amhara (Haile 2004 and Ziegler 2005).

3.5.2 Government policy responses to 2002/2003 famine

Following the recent famine of 2002/03, the government designed a national Food Security Programme (FSP) called the New Coalition for Food Security, within the framework of Ethiopia's Poverty Reduction

Strategy (FSCB M&E task force 2004)[4]. The coalition included government, development partners, civil society, the private sector and local communities (Canadian International Development Agency 2004 cited in Fosse 2006). The programme sought to attain food security for five million chronically food insecure people, and significantly improve the food security of an additional 10 million people who are increasingly vulnerable to shocks and subject to transitory or acute food insecurity in times of drought (FSCB M&E Task Force 2004).

The programme included resettlement as a major component of a strategy that also comprised productive safety nets and other food security interventions. The third component (i.e. other food security programmes) included a range of developmental interventions, either by the government or by different donors (FSCB M&E Task Force 2004). As reported by the Department for International Development (DFID 2006), cited in Fosse (2006), the Productive Safety Net Programme and other food security programmes were to be funded by international donors like the World Bank, the EU and DFID. However, the resettlement programme, which the donors opposed, was to be financed by the Ethiopian government with a proposed cost sharing structure of 75% federal, 20% regional, and 5% local. This entailed the host woredas contributing their share of the costs from their own infrastructure budgets (New Coalition for Food Security in Ethiopia 2003).

With regard to its implementation, the Food Security Coordination Bureau (FSCB), established under the Ministry of Agriculture and Rural Development (MOARD), was to be responsible for the overall management of the programme at the federal level. At the regional and woreda level, food security coordination offices/desks were assigned for the direct implementation and management of the programme. They were also tasked with carrying out most of the data collection, analysis and reporting, with the active collaboration of other government agents at the grass-roots level (Kebel level) (FSCB M&E Task Force 2004).

In this context, the Productive Safety Net Programme was designed as an asset protection mechanism at the household level. It aimed to create productive community assets in order to address the problems of chronically food-insecure communities through two main components (Adenew 2006).

The first of these components consists of labour-intensive public works projects, which include the construction of schools and roads as well as soil and water conservation, and water development (springs, irrigation, and ponds). Households participate in the projects as labourers. Payment to the

[4] See the components and objectives of the programme in Appendix 1

labourers is either made in cash or the equivalent value in food, thereby protecting household assets from depletion. In addition, as a result of the public works projects, livelihood opportunities are enhanced through the creation of community assets. The second element comprises a 'direct-support' component to those households who have no labour at all, no other means of support, and who are chronically food-insecure.

3.5.3 Implementation of the resettlement programme

The resettlement programme aimed to resettle about 2.2 million people (440,000 chronically food-insecure households) from regions of Ethiopia which are incapable of supporting current levels of productive activity because they suffer from high demographic land pressure, overgrazing, and a long history of improper land use and over-cultivation. Resettlement was specifically encouraged to areas which the government believed to be fertile, with less demographic land pressure and with surplus cultivable land. The intent was to enable settlers to become self-sufficient in food production within three years through improved access to productive land.

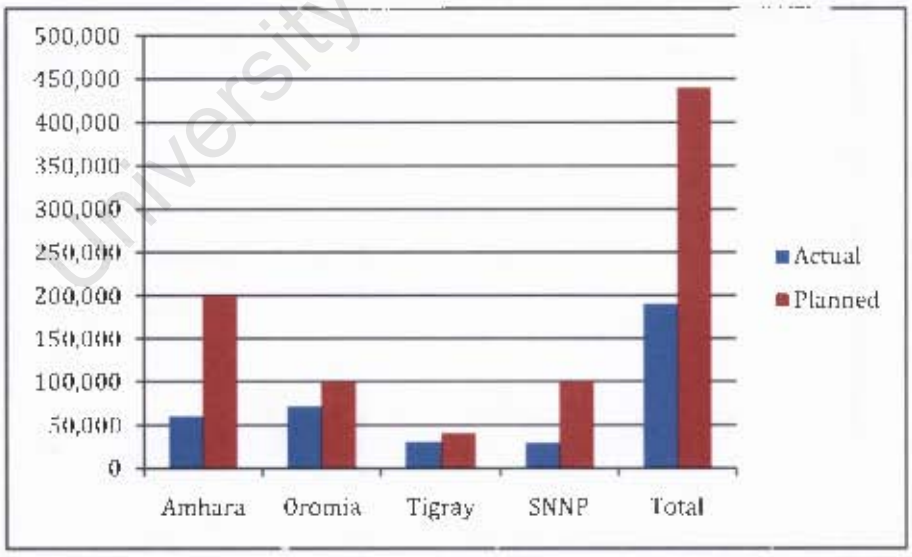
The resettlement programme was conceived to be intra-regional and has been implemented in four regions, namely Tigray, Oromia, Amhara, and the Southern Nations, Nationalities, and Peoples Region (SNNPR). The number of households proposed to be resettled in the regional states was 200,000 and 40,000 respectively for Amhara and Tigray, and 100,000 each for Oromia and SNNPR (New Coalition for Food Security in Ethiopia 2003).

The programme also foresaw a benefit package and fulfillment of preconditions for resettling households (New Coalition for Food Security in Ethiopia 2003). This comprised: Firstly, participation in the programme was viewed as voluntary, with the settlers having the option to return to their original homelands if unhappy. They were also entitled to have land use rights for their holdings in their original homeland for three years. Secondly, it was expected that the availability of underutilised arable land in each regional state would be established. Thirdly, it was also expected that proper consultation would be undertaken with the host community. Lastly, the policy document also explained the need for proper preparation to ensure that a 'minimum of infrastructure and services' that were consistent with those in the home area, such as health services, water supply, primary schools and roads in and around the resettlement sites, two hectares of farmland per household, food rations until the first crop harvest,

other agricultural inputs, and 1000 birr[5] per household as credit to purchase an ox (New Coalition for Food Security in Ethiopia 2003).

The programme implementation was proposed to extend over three years, from 2003 to 2005, with the number of households to be resettled in the first, second and third years estimated at 100,000, 150,000 and 190,000 respectively. Furthermore, the programme also emphasised that these figures were dependent on the voluntary choices of the households to be resettled and were viewed as flexible within each region (FSCB M&E Task Force 2004 and New Coalition for Food Security in Ethiopia 2003). Despite the original implementation window of three years, the total number of households resettled in six years (2002/2003-2006/2007) of the programme was only 188,874 (43% of the planned total), as shown in Figure 5 below. This total was made up of a regional distribution of 55,892, 59,563, 29,957 and 19,556 households in Amhara, Oromia, Tigray and SNNP regional states respectively. The number of households resettled in the first three years of the programme was 149,625 (Federal Government's Food Security Programme Quarterly Bulletin 2007/2008). From this it is clear that there have been significant shortfalls in achieving resettlement targets. For instance, in Amhara regional state only 55, 892 households out of the planned 200,000 households (28%) took advantage of the programme.

Figure 5: Planned vs actual number of households resettled in the current resettlement programme



Source: Federal Government Food Security Programme Quarterly Bulletin (2007/2008), No. 1

[5] Birr is Ethiopian currency and one USD was equivalent to Birr 11.1 in January 2009

3.6 Description of the Study Area: Metema District in Amhara National Regional State

3.6.1 Amhara National Regional State (ANRS)

Ethiopia is a federal state consisting of nine regional states and two city administrations. The Amhara National Regional State (ANRS) is one of the nine regional states of Ethiopia. It is located in the north central and north western parts of the country, between $9^{\circ}\ 21'$ and $14^{\circ}\ 0'$ North and $36^{\circ}\ 20'$ and $40^{\circ}\ 20'$ East (Lakew 2006).

The region is bounded by four national regional states, namely Oromia in the south, Afar in the east, Tigray in the North, and Benshangul Gumez in the west. The regional state also shares a common border with the Republic of Sudan in the west.

Figure 6: Maps showing the location of Amhara National Regional State (ANRS) and North Gondar zone

Source: Designed by Anne Westoby, 2009

Administratively, the region consists of 10 administrative zones as well as one special zone made up of its capital city, Bahir Dar, located 565 kilometres from Addis Ababa. The ANRS also encompasses 140 woredas and over 3429 kebeles (www.ethiodemographyandhealth.org). With an estimated area of 170,752 square kilometres, the region covers 15.4% of the country's total land area, which makes it the second largest state in the country, after the Oromiya regional state (Lakew 2006).
With a population of over 17 million in 2007, the region is the most populous after Oromia. It accounts for 23.3% of the country's population (Census 2007). About 87% of Amhara's people live in rural areas and depend on agriculture (United Nations Capital Development Fund ND). Moreover, the region accounts for almost one third (27.9%) of the total livestock population of the country, 30.7% of poultry and 18.5% of beehives (USAID Collaborative Research Support Programmes Team 2000).

Topographically, the Amhara Region is very diverse, comprises lowland, midland and highland plains, as well as mountains, rugged lands, undulating landforms and chains of plateaus. The lowland or hot areas (below 1500 m), which cover 31% of the region, are found in the North West, bordering the Sudan, and in the eastern parts, bordering the Afar region.

The highland or cold zone (between 2500–4620 m) covers 25% of Amhara regional state. In the north it features the highest peak in Ethiopia at 4,620 metres above sea level, and massive mountain ranges can be found in the east and west. The temperate zone (between 1500-2500m) covers 44% of the region (Amhara Development Association, 2003 and Tesfahun et al., ND).

The region is rich in water resources. It is the source of the famous Blue Nile and features some 49 other perennial rivers as well as many lakes. Lake Tana, which is the third largest lake in Africa, is also found in the region (Tesfahun et al., ND). Although the distribution is uneven, the region receives 80% of the total rainfall in the country (BoRD 2002 cited in Tesfahun et al., ND). In addition, different studies indicate that approximately 1,020,000 acres of land are fit for irrigation (Amhara Development Association 2003).

Despite the presence of such huge water-wealth and potential for irrigation, agriculture in Amhara is characterised by rain-fed and subsistence farming, like all other regions. Thus, the ANRS is one of the poorest in the country. The population is highly vulnerable to recurrent drought and food insecurity, which is caused by a range of biophysical and socioeconomic challenges and a chronically underperforming agricultural sector. This in turn is as the result of erratic rainfall, the prevalence of

pests and diseases, the scarcity of farmland, soil erosion and degradation, the lack of improved technologies, poor socioeconomic infrastructure and a range of other constraints of this nature. According to the United Nations Capital Development Fund (ND), out of 106 woredas in the region, Amhara has 52 of the most drought-prone woredas in the country[6]. Wollo (North and South Wollo zones), which is often associated with famine, and which was severely affected in the well-known Ethiopian famine of 1984, is also found in this region.

According to the Sustainable Development and Poverty Reduction Programme (SDPRP) of the Federal Republic of Ethiopia (FDRE), Amhara has a reported head count index (number of people living below the absolute poverty line) of 54%, and thus this region's rate of absolute poverty exceeds the national average by 8% and the Sub-Saharan African (SSA) average by 15% (SDPRP, 2002 cited in Tesfahun et al., ND).

As part of the federal government food security programme, a resettlement programme was designed for the most chronically food-insecure people from all the region's zones (except west Gojjam). The targeted populations were to be relocated to the North Gondar zone woredas of Metema, Quara and Tsegede-Armachiho (Sewonet 2003).

3.6.2 Metema resettlement area

The study site for this research is Metema Resettlement District. This is the most north-western district of Amhara, located about 900 km north-west of Addis Ababa and about 180 km west of the town of Gondar in the North Gondar zone of the Amhara region. The woreda is bounded by a 60 km long border with the Republic of Sudan. According to the 2007 census, Metema has a population of 110, 231 and total area of about 440, 000 hectares, rendering this woreda very sparsely populated relative to other districts. The population density was estimated at 20.8 persons per square kilometre as of July 2008 (www.ethiodemographyandhealth.org), far below the national average of 60 persons per square kilometre (Ali 2007).

According to several studies and reports, land availability is not a problem and the district is generally considered to have high potential. This is despite its low level of development, poor infrastructure, hot

[6]Note that recently the region was re-divided into 140 woredas

temperatures and the fact that malaria, bilharzia, livestock diseases, crop pests and other animal and human health threats are endemic to the woreda (Waktola 1999). According to the IPMS team (2005), in addition to the 312,300 hectares of forest and grassland used for livestock and gum production, the district has 18, 676 hectares of potentially cultivable lands.

Topographically, the altitude of Metema ranges from 550 to 1608 metres above sea level. Given that Metema has one of the harshest climates of any woreda in the country, the government allocates a 30% salary top-up as a hardship allowance to public servants. The minimum annual temperature in Metema ranges between 22°C and 28°C. During the months of March to May, the temperature may reach as high as 43ºC. The mean annual temperature is 31°C (Berhe 2006).

This woreda has one rainy season, which extends from June to the end of September, but it is not evenly distributed. Most of the rainfall is received during the months of July and August. Due to this, waterlogging has been reported. Waterlogging is most problematic during the heavy rainfall months, and it causes serious problems with agricultural production (IPMS team 2005). Furthermore, with an estimated mean annual rainfall of between 700 and 900 mm, the woreda receives the lowest amount of rainfall in the region. High evaporation rates, as a result of Metema's elevated temperature, lead to additional challenges for resettlers and government (IPMS team 2005). There are three major rivers that flow through the woreda, namely the Shinfa, Guang and Genda Wuha.

Like all other woredas in the country, agriculture in Metema is rain-fed. However, unlike in the highlands, farmers in the Metema woreda grow mostly commercial crops such as sesame and cotton. An extensive area of the woreda is covered with different gum and incense species, which farmers collect and use as a means of income. Furthermore, according to the IPMS team (2005), groundnuts and mung beans could serve as additional potential commercial crops for the area. Sorghum is the major food crop grown in this woreda.

Due to the availability of grassland, the cattle population in Metema is high and livestock production is an integral part of the production system. Households commonly raise goats and cattle. Cattle are exported to the Sudan while goats are mainly used for the local market (IPMS team 2005).

Figure 7: Maps showing location of Metema Resettlement District and North Gondar Administrative Zone

Source: Source: Designed by Anne Westoby, 2009

3.6.3 Rationale for selection of Metema as study area

As mentioned earlier, the Amhara region is one of Ethiopia's regional states that suffer high levels of food insecurity. The region is overpopulated both in human and livestock terms, especially in the highlands. While the region covers 15.4% of the total area of Ethiopia, 23.3% of the country's human population lives in this state. However, the region also has sparsely populated areas, such as its north-western territory, which are capable of supporting a large number of people. Due to this capability, Amhara was one of the four regional states in which intra-regional resettlement were considered as a potential solution to the problem of food insecurity.

Of the 2.2 million people whom the government planned to resettle, 45% were to be drawn from this region (New Coalition for Food Security in Ethiopia 2003). Given that resettlement is such an integral component of any food security strategy, it follows that an investigation of the opportunities, vulnerability conditions, livelihood activities and constraints faced by households in ANRS resettlement sites has important policy implications. This applies both for households already resettled as well as for designing and implementing more robust resettlement programmes that might be undertaken in the future. This motivated the researcher to select the Amhara region as the focus of his study. Furthermore, language did not constitute a problem as the study population speaks the same language (Amharic language) as the researcher.

Metema, Quara and Tsegede-Armachicho were the host districts for the ANRS intra-regional resettlement programme of 2003 to 2005 (Sewonet 2003). Of these, Metema district was chosen for this research. The specific selection of Metema as the field site for this research was with reference to two factors. Firstly, Metema was more accessible to the researcher in comparison to the other resettlement districts, which were more remote and were not accessible by road. Secondly, Metema was one of the districts which were considered capable of accommodating the largest number of resettlers and as having the potential for absorbing the populations of future resettlement programmes (Sewonet 2003).

3.7 Summary

This chapter sought to provide a clear context for the study. It has provided an overview of the role of a agriculture in the Ethiopian economy and the dominant agricultural activities in the country. It provided also detailed discussions with regard to population distribution and agricultural activities in relation to topography and climate. The chapter reviewed the history and rationale for the resettlement under three regimes including the food security problem of the country. The chapter then provided detailed overview of Amhara regional state and the study area.

CHAPTER FOUR
METHODOLOGY

4.1 Introduction

This chapter describes the methodology used for this study, which integrates both qualitative and quantitative approaches. The chapter begins with an overview of the methods used in their order or sequence. It continues by describing secondary data sources as well as the preparatory steps undertaken for primary field research. Detail is then provided on the implementation of the field research in Metema resettlement district. This is followed by a description of the steps involved in consolidating and analysing the qualitative and quantitative data collected in the field. The chapter concludes with a summary.

4.2 Overview of Research Methodology

Multiple methods and steps were applied to collect data and analyse the findings. These include preparatory work for field research and data collection prior to and on arrival in Metema. They also involved primary data collection at the three field sites as well as numerous steps in consolidating and analysing the field research findings. Table 2 summarises the data collection and analysis process for this study.

Table 2: Stages in the research process

No.	Stages	Purpose	Methods and Procedures used	Data Sources
1	Preparatory work for field research and data collection (Cape Town, Bahir Dar and Addis Ababa)	Collection of relevant secondary data on resettlement policies	Field work	Key government ministries in Addis Ababa and Bahir Dar
		Preparation of data collection tools	Household survey questionnaire prepared and translated -Open-ended interview schedules prepared for focus group and key informant interviews	Informed by past studies
2	Preparatory work for field research (Metema)	Collection of relevant secondary data from district	Field work	District offices
		Selection of research sites and securing permission for access	Consultation of a key informant and based on differences in access to roads and proximity to district town	A Key informant at District Agriculture and rural development office
		Selection of research assistants and orientation	Selection is made in consultation with a key informant; and orientation is made during pilot survey	Key informant at District Agriculture and rural development office
		Pilot testing of household survey and modification	Interview of 10 selected households	Residents in Afitit Kebele
		Determination of sample size	Using proportion formula	Amhara regional state food security coordination and prevention office
		Selection of sample households	Systematic sampling walking along the sites	Research assistants and the village councillors
		Selection of focus group participants	Consultation of village councillors	Village councillors
3	Primary data collection	Qualitative data collection in three research sites at Metema district	6 focus group interviews	Village residents
			4 key informant interviews	Officials at different bureaus
			Field observation and photography	
		Quantitative data collection	93 households interviewed	Village residents

No.	Stages	Purpose	Methods and Procedures used	Data Sources
4	Data consolidation	Consolidation of qualitative data	Summarizing notes every day immediately after field. Ranking of accessibility of essential services	
		Consolidation of quantitative data	Using Microsoft excel, SPSS and Stata software	
5	Data analysis	To identify the most common socioeconomic and environmental risks perceived by households in the resettlement sites	Descriptive methods and direct quotations	Focus group interviews, key informant interviews, observation and secondary data
		To generate and explain comparative household livelihood profiles differentiated by: • resettlement site • socioeconomic and demographic factors (age, gender, year of resettlement)	Descriptive statistics such as percentages, table and Chi-square. Through development of livelihood fragility index	Focus group interviews, key informant interviews, observation and household survey
		To generate and explain comparative risk outcomes (indicated by households' perception of wellbeing and food security status) differentiated by: • resettlement site • socioeconomic and demographic factors (age, gender, year of resettlement etc)	Descriptive statistics such as percentages, table, Chi-square; and livelihood fragility index.	Focus group interviews, key informant interviews, observation and household survey

4.3 Collection of Secondary Data

In order to gain some insight and a better understanding of the key themes relevant to this study, efforts were made to review all available secondary sources of information. These included past disaster risk histories and risk profiles in the resettlement district as well as agricultural practices; policies regarding the resettlement programme; details of the resettlement process as well as the support that had been provided to the resettled; and information regarding the number of total households resettled in the four regional states where intra regional resettlement had been undertaken. These sources are listed below in Table 3.

Table 3: Secondary data and rationale to the study

Data Source	Type of Document/report	Rationale/Purpose to the stucy
Disaster Prevention and Preparedness Agency (DPPA) Amhara regional state bureau (Bahir Dar)	Resettlement policy document Reports on number of resettled households.	To investigate the kind of resettlement preparations made. Comparison was made between planned and actual number of resettled households
Livelihood Integration Unit at the federal DPPA (Addis Ababa)	Recorded past disaster events	Illustrate disaster risk history and context in the district of Metema
Amhara Credit and Saving Institution (Metema District)	Number of credit beneficiaries	To investigate access to credit services and constraints
Metema Woreda Rural Development and Agricultural Office	A report document	To investigate the task accomplished and the constraints faced during implementation

4.4 Preparation of Tools for Primary Data Collection

4.4.1 Overview

Several complementary data collecting instruments were used for research in Metema. These included the development of a household questionnaire, a checklist for focus group and key informant interviews, guideline for field observation.

4.4.2 Household questionnaire

For the purpose of the household survey, a provisional questionnaire in English was prepared. It was informed by survey questions that have been used in other studies and was translated into Amharic. The pilot survey questionnaire was tested in 10 randomly selected households in the Aftit resettlement site (a site nearest to the Woreda town of Shehedi) with the assistance of the two research assistants. The questionnaire was then modified to incorporate necessary changes, and some of the wording was modified in order to fit the local context.

Major areas addressed in the questionnaire included:

- Household demographic composition (age, marital status, education, number of household members)
- Major socio-cultural, livelihood, health and environmental risks (living challenges) perceived by households and their coping strategies
- Household sources of livelihood and opportunities for change (land holding size, sources and level of income; livestock ownership, livelihood activities); and service provision compared to home areas of the resettled (access to health, credit, drinking water and education)
- Resettlement processes (reasons for moving, transport and support given during resettlement) and household perceptions on their food security status and wellbeing compared to home area

4.4.3 Checklists for focus group and Key informant interviews

Focus group interviews as a qualitative data collection technique were used to complement the data from the household survey. This aimed to add depth to the researchers' understanding of household perceptions on wellbeing, the resettlement process, the environment conditions compared to the original areas, risks in the area, access to different socioeconomic services, relations with the host population, access to public resources such as grazing land, and the livelihood activities and opportunities in the area. To avoid missing important information, the researcher used an open-ended checklist (see Appendix 3).

Key informants in this study include district government officials such as an agriculture and rural development officer, a health assistant at the resettlement sites, a Metema district food security and early warning process officer[7], a district officer at the Amhara saving and credit institution, and a food security process officer at DPPA of the Amhara regional state. These personnel provided information about the resettlement process and the support given to the resettled, health and socio-economic situations, livelihood activities and access to credit services. To avoid missing information a check list was developed and written in a note book before approaching each of these key informants.

4.4.4 Guidelines for field observations

A guide line of what the researcher needed to observe was written on a note book, before the researcher undertook field observation walking through the villages and undertaking informal discussions with community members on different occasions.

4.5 Selection of Field Research Assistants

The household survey for this study was undertaken with the support of two research assistants from the Metema district. They were selected in consultation with the district's food security process officer, who was responsible for the resettlement programme in the district. The research assistants were employees of the Woreda Food Security Desk, and knowledgeable about the area as they had been

[7] The key informant was identified as 'owner'. For the purpose of this thesis this position is referred to as food security and early warning process officer

working in the resettlement sites during the implementation stage. The research assistants were employed due to time constraints to collect the required information alone. Besides, as the area is too harsh and there was no appropriate transport system getting to the village alone is risky. Moreover, having employed different means of data collection methods, it was difficult for the researcher to accomplish all alone. But employment of the research assistants has its own limitation on the reliability of the data. However, to minimize risks of reliability, the research assistants were provided on the field training and an oral briefing on the objectives of the research and the methods of data collection and interviewing techniques that would be used before they undertook the final survey. They tested the entire questionnaire during the pilot stage.

4.6 Selection of Research Site and Sampling Methods

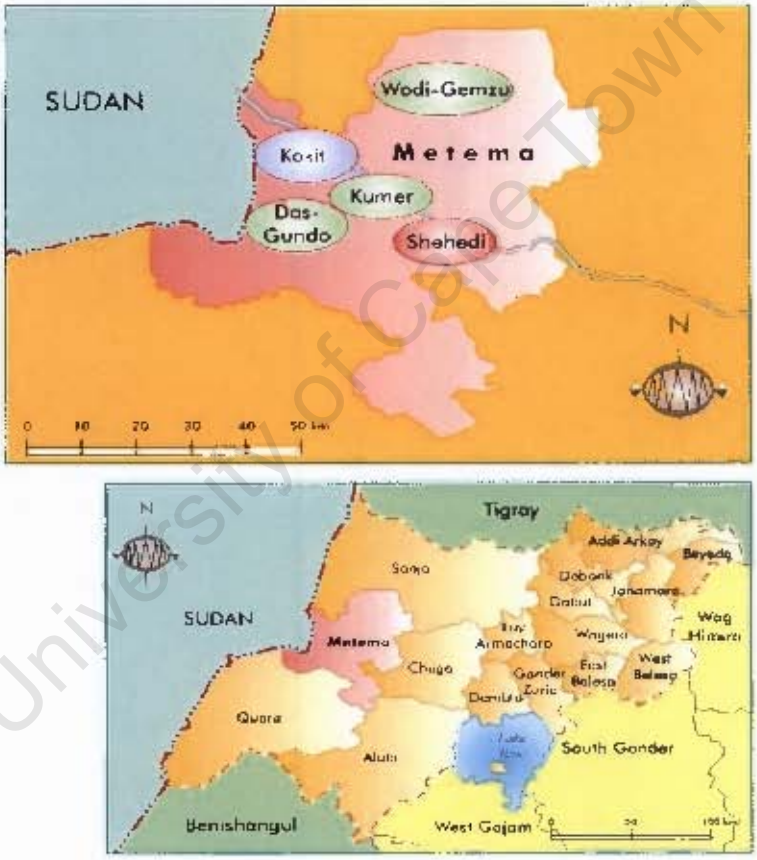
4.6.1 Selection of research sites

Metema Woreda has 14 sites where resettlement took place from 2002/2003 to 2006/2007 (according to a key informant from Metema Woreda Food Security and Early Warning Department 2008). From these, three (Kumer, Das-Gundo and Wodi-Gemzu) were selected in consultation with the Woreda Food Security and Early Warning Process Officer, who is responsible for the implementation of the programme at the woreda level (see Figure 9). These three sites represent different degrees of road access, thus making it possible to investigate the effects of location on the vulnerability and livelihood status of the resettled households as well as to investigate the opportunities available in the sites themselves.

Kumer is the closest site to the district town (previously called Shehedi and now renamed as Genda-Wuha). As it is located along the main road from Gondar to Sudan, about 13 kilometres from Shehedi, access to transport did not constitute a problem. Das-Gundo is located 31-kilometres north-west of the district town. The route to get there comprises an 18 kilometre stretch along the main road (relatively good "all weather" road) to a junction village called Kokit, with the remaining 13 kilometres from Kokit to the site along a dry weather road that is sometimes accessible by truck transport and otherwise by foot. Since the research was conducted during the harvest season, when the soil is dry and trucks go to the sites to buy crops from farmers, it was possible for the researcher to get a lift to Das-Gundo on an Isuzu truck after waiting for about 6 hours at Kokit.

Wodi-Gemzu is located about 49 kilometres north-east of the district town. About 18 kilometres of this route is along the main road to Kokit, but from Kokit to the settlement there is not even a seasonal road. However, it is sometimes possible to get a lift with one of the trucks during harvest times when merchants are transporting sesame from the site. Luckily, the researcher managed to get an N3 truck for the first 20 kilometres to the nearest village, called Debiko, and covered the remaining 11 kilometres by foot.

Figure 8: Maps showing the three field research sites (green shaded circles) and Metema district



Source: Designed by Anne Westoby, 2009

Note: The positions of the sites are not exact. They are the author's own estimates.

4.6.2 Determination of sample size

Regarding household sampling, the researcher originally planned to determine the sample size in each kebele using the estimated proportion formula (Yamane 1967) indicated below. This would be used after the list of households resettled in each kebele had been identified by using reliable sources in the district.

$$n = \frac{N}{1 + N(e)^2}$$

Where: n is the sample size, N is total number of households resettled in the kebele and e is the level of precision, usually 5-10%.

However, the researcher could only manage to obtain the total number of households resettled in the district who still live there (i.e. 8,759) from the Amhara National Regional State Food Security Coordination and Disaster Prevention Office. No list was found in the region or the district offices that could show the total number of households resettled in each of the sites selected for this study.

Therefore, the researcher applied the proportion formula only to determine the total sample size of households interviewed at the district so as to generate a representative sample, rather than applying it to each of the sites selected. Hence, the proportionate sampling method was used to determine the sample size at the district level. These steps are summarised in Table 4 below.

Table 4: Summary of steps in the sampling process

Step	Purpose	Method used	Remark
1	To estimate the number of households in each resettlement site.	Total number of resettled households in the district was divided by number of resettlement sites in the district.	Assuming proportional number of households in each site
2	To estimate the number of households in the resettlement sites under the study.	Three times the result found in step one (i.e mean number of resettled households per site times three).	Total number of households in the sites was found to be 1878.
3	To determine the total number of households to be interviewed.	The proportion formula presented in section 4.6.2 was used.	The total sample size was 94 households.
4	To determine the sample households in each site.	The result in step three divided by the number of sites visited (i.e. three) = [94/3]	31 in each of the three sites.

4.6.3 The selection of the sample households

To select the sample households, the researcher applied the systematic sampling method. In this context, every 20th household was interviewed. The estimated total numbers of households in each of the three sites were divided by its sample size to determine the interval (i.e. every 20th household). The researcher used the systematic sampling method to remove the issue of bias between the proportion of male-headed and female-headed households, as it provides all the households in the community an equal chance of being included. The high mobility of households from December to the end of January (after harvest) to visit the original area meant that some of the households were not available for interview. If this happened, the next household was chosen.

4.7 Primary Data Collection

4.7.1 Overview

The process that researchers undertake in order to gain entry into communities significantly contributes to its success or failure (Moorlag 2008). In this case, the research assistants played a key role in introducing the researcher to the village councillors and community members. The research assistants had a deep understanding of the resettlement sites and community members, and were personally known to most community members as they had been coordinating food distribution and other assistance in the villages during the resettlement period.

Early on in the field research process, the researcher approached the village councillors from each community in order to introduce the study and to help organize focus group participants as well as guiding the researcher in walking through the village during identification of the sample households. The village councillors then introduced the researcher to representative community members for focus group discussions. The sampled households were identified by walking through the villages with the village councillors.

The community members were very hospitable and very respectful. As there were no shops to buy food, community members at Wodi-Gemzu invited the researcher into their homes and offered food, milk and local beer (Tella) during his stay at the site. He slept at the home of one of the community members who was a storekeeper for the Agricultural and Rural Development Office. The store was built for the resettlement programme in order to store materials for distribution to the resettled households. The research assistants knew him very well as they worked together during the resettlement period. At Das-Gundo there were places to buy local food, and the researcher slept at the house of a community member who was a small trader and knew one of the research assistants. Since access to transport was not a problem due to the proximity of the site to the district town 13 kilometres away, the fieldwork at Kumer was done by travelling daily from the district town.

The field survey was conducted in 27 days, from the 6th of December 2008 to the 2nd of January 2009. Seven days at Kumer and eight days in both Das-Gundo and Wodi-Gemzu resettlement sites were spent on primary data collection. The remaining four days were spent at the district centre undertaking key informant interviews and collecting secondary information from different bureaus. In addition to

consulting with his research assistants, the researcher spent this time undertaking focus group interviews and recording personal observations.

4.7.2 Qualitative data collection

Focus group interviews

A focus group interview is a discussion in which a small number of people (usually six to 10) talk about a topic raised by a moderator or facilitator (Goering and Streiner 1996). The objective is to obtain detailed information about a particular topic and to draw out precise issues that may be unknown to the researcher. In this regard, six focus group discussions were held; three with community representatives of the resettled households in each of the three sites, two with the host community at two of the resettlement sites (Kumer and Das-Gundo), and one with female headed households and wives of heads of households at Kumer resettlement site. It was difficult to get groups of women to undertake focus group discussions at Das-Gindo and Woc-Gemzu. There was no host community at Wodi-Gemzu as it has just been established by the resettled households.

The focus group interviews lasted from 40 minutes to two hours. They focused on the resettlement process, relations with the host community, the major socio-economic problems encountered, the state of the socio-economic services in the sites, and the support provided from different stakeholders and the government. The host communities were asked about their opinions of the resettlement programme, their relations with the resettled community and the problems they encountered due to the resettlement programme.

4.7.3 Quantitative data collection

The survey was conducted in 93 sampled households (31 households in each of the three selected resettlement sites). Each household interview lasted approximately 80 to 120 minutes. On average each of the research assistants managed only to conduct three household interviews per day. This was because of the harsh environment in the sites (it is possible to work only a few hours early in the morning from 7:00 to 11:00); and sometimes households to be interviewed were not available. Moreover, considerable time was spent in travel as the sampled households were far from each other, since every 20th household was selected. It took about 15-30 minutes on average to walk from one sample household to the next one. An additional constraint was posed due to the limited levels of formal education for most of the households interviewed. This created a challenge in explaining questions in the interviews and took more time than expected to ask them in a way that they could understand and respond.

4.8 Data Consolidation and Analysis

4.8.1 Consolidation of qualitative data

Notes from key informant interviews, focus group interviews and personal observations were transcribed and summarised as quickly as possible upon return from the field. Information from key informant interviews, focus group interviews, personal observation and secondary sources were subsequently applied to the quantitative findings in different sections of the study, in order to explain or corroborate the results. Direct quotes were occasionally used in presenting the findings from the key informant and focus group interviews, according to their contexts in the study.

4.8.3 Consolidation and analysis of quantitative data

Microsoft Excel and Stata software were used to encode and analyse quantitative data. Data from the household survey and secondary data were compiled using Excel and then imported to Stata for computation.

The study mainly used descriptive statistical methods to analyse the data from the household survey and quantitative secondary information. The data has been interpreted contextually using simple descriptive statistical techniques such as averages, percentages, tables and frequency distribution. The Chi-square statistics technique was used to look the statistical significance of differences between households of different categories in relation to income and other livelihood outcomes. For example, the differences in income levels in relation to age of the head of household head or the gender of the household head.

In addition, the livelihood fragility index was developed in order to compare the livelihood profiles of households between the three resettlement sites and to examine the association between the household livelihood profile and food security status as a livelihood outcome. The following section discusses the methodology used to develop the composite index.

4. 8 Household Livelihood Fragility Index

4.8.1 Rationale for development of livelihood fragility index

As outlined earlier, the disaster risk literature emphasises the role of vulnerability as critical. However, the concept of vulnerability in disaster risk analysis is applied to examine the relationships between indicator variables in relation to a specific hazard. In this study, however, various environmental and socioeconomic threats such as striga weed infestation, waterlogging, malaria and price fluctuation were identified as key in the resettlement sites. Hence, limiting the research's focus on household vulnerability to a specific threat was viewed as too narrow. Therefore, for the purpose of this study it was decided to focus on more inclusive conceptualization of household livelihood fragility.

In this context, the concept of household livelihood fragility incorporates an inclusive view of household capability. This included both the asset and resource endowments of a household as well as those provided by the broader formal and informal social system. It also includes the institutional and structural enabling/constraining environment at different levels such as local, national and international. In this context, household livelihood is viewed as "less fragile" when households have relatively more secure ownership of assets, or access to resources (both tangible and intangible) and income earning activities, which helps to ease the impact of shocks, and meet food requirements and other needs.

4.8.2 Overview

In order to examine and compare the relative robustness of household productive resources in the three resettlement sites, a composite index was developed. The index adapted the methodology by Sharp (2003) in the development of a destitution index applied in Wollo district. It was also significantly informed by qualitative data derived from field research in this study. The index consisted of five major components based on the sustainable livelihoods framework, each of which was further divided into sub-indicators. These were aligned to established categories of natural, human, physical, social and financial assets (for details of the sub-indicators see Appendix 6). These subcategories comprised variables of direct relevance to food security. Data from the household survey was used to select the socioeconomic indicators and develop the composite index.

4.8.3 Scaling values of indicators to develop the index

Since each of the sub-indicators is measured on a different scale, it was necessary to standardise each indicator into comparable units so all could be combined to construct the composite index. Hence, the indicators were scaled from 0 to 1. The equation used for scaling each of the variables was adapted from Sharp (2003) who used it in measuring destitution in the Wollo districts of Ethiopia. The formula is as follows:

$$Scaled\ value = \frac{(Xi - Xmin)}{(Xmax - Xmin)} \quad \text{eq1}$$

Where X is the actual value of sub indicator for a specific household; X_{min} is the minimum values of each sub-indicators; and X_{max} is the maximum value of each sub-indicators. The transformed values now would be scale free and would have a mean of zero and a standard deviation of unity.

However, one should note that for indicators where a high value has a negative influence and low value is positive (for example farm distance from dwelling), the above formula should be inverted as follows:

$$Scaled\ value = \frac{(Xmax - Xi)}{(Xmax - Xmin)}$$

As Sharp (2003) noted, the maximum and minimum values used in scaling each of the sub-indicators can be the actual data ranges, or they can be threshold values chosen according to context. In the context of this study, since the major purpose was to examine the relative differences in household asset profiles between locations; and to determine the association between household asset profile and food security status of households, the actual data was used.

4.8.4 Weighting of indicators

Not all sub-indicators conferred equal importance in the livelihoods of resettled households. Therefore, the issue is one of finding weights appropriate to each of the indicators. Thus, after the indicators were standardised (scaled), it was necessary to assign weights for each so that the relative influence of each variable is reflected in the overall index. It was recognised that assigning of weights based on the basis of independent judgment could be influenced by subjectivity. Therefore, in this study a Principal Component Analysis (PCA)[8] method was used. This was adapted from Sharp (2003) who used the method to quantify destitution (identify destitute households) in the rural area of Wollo district in Ethiopia.

As Filmer and Pritchett noted, the PCA determines the weights for a composite index by extracting from the given set of variables in such a way that the weights given maximise the sum of the squares of correlation (Filmer and Pritchett 1998 cited in Sharp 2003: 29). However, the weights given to the indicators are chosen in such a way so that the Principal Components satisfy two conditions: Firstly, the numbers of Principal Components are equal to the number of indicators and are uncorrelated or orthogonal in nature. In this study 14 components were extracted (equal to the number of indicators), but based on the Kaiser criterion of an Eigen value[9] only 5 were found significant (see Appendix 7).

Secondly, the first Principal Component or P1 absorbs or accounts for the maximum possible proportion of variation in the set of the indicators. The first component explained a 17.12% variation, which was

[8] PCA is a type of factor analysis which is usually used in reducing data dimensionality by performing a covariance analysis between factors (Zou et al.; 2004)

[9] The Eigenvalue is a measure of standardised variance with mean 0 and standard deviation 1. Each standardised variable (i.e. each of the 14 indicators in this case) contributes at least the variance of 1 to the principal components extraction. The Kaiser criterion states that unless a principal component extracts at least as much as one of the original variables (i.e. has a standardised variance equal to or greater than 1), it should be dropped from further analysis (Sharp 2003).

larger than the other components, and this gives positive weights for all the 14 indicators. Therefore, the first component was chosen to assign the weight for the indicators and the result was presented as follows. The weights for each of the indicators are presented in Appendix 8.

4.8.4 Constructing the "livelihood fragility" index

The overall livelihood fragility index as well as the index for the five major asset components was constructed by applying the following formula, which is adapted from Sharp (2003).

$$\sum_{i=1}^{k}[wi(aji - mi)]/si \quad \text{----------eq2}$$

Where Dj is a standardised index (Livelihood fragility index) for household j;

wi is the weights (scores) assigned to the (k=16) variables on the first principal component;

aji represents the observation for the jth household on the ith variable;

mi is the mean of the ith variable; and

si is the standard deviation of the ith variable.

The result in equation 2 then was scaled (normalised) from 0 to 1 by applying equation 1. The overall livelihood fragility of all households was then ranked according to their score on this combined standardised index. Households ranking lowest on the index (nearest to zero) were seen as having most fragile livelihood while those ranked closer to 1 were viewed as having a less fragile portfolio of livelihood. Households were categorised into three groups as indicated in Table 5 below to compare livelihood fragility level between the three resettlement sites.

Table 5: Subjective classification of households in different livelihood fragility levels based on the index

	Category		
	Highly fragile	Fragile	Less Fragile
Index value	≤0.35	0.36-70	>0.70

4.9 Integrated Qualitative and Quantitative Methods

This research has applied both quantitative and qualitative study methods. On the one hand, quantitative methods assist in producing inferential results that can usually be used to generalize to some larger population; and help to describe, test, and examine cause and effect relationships (Burns & Grove 1987).

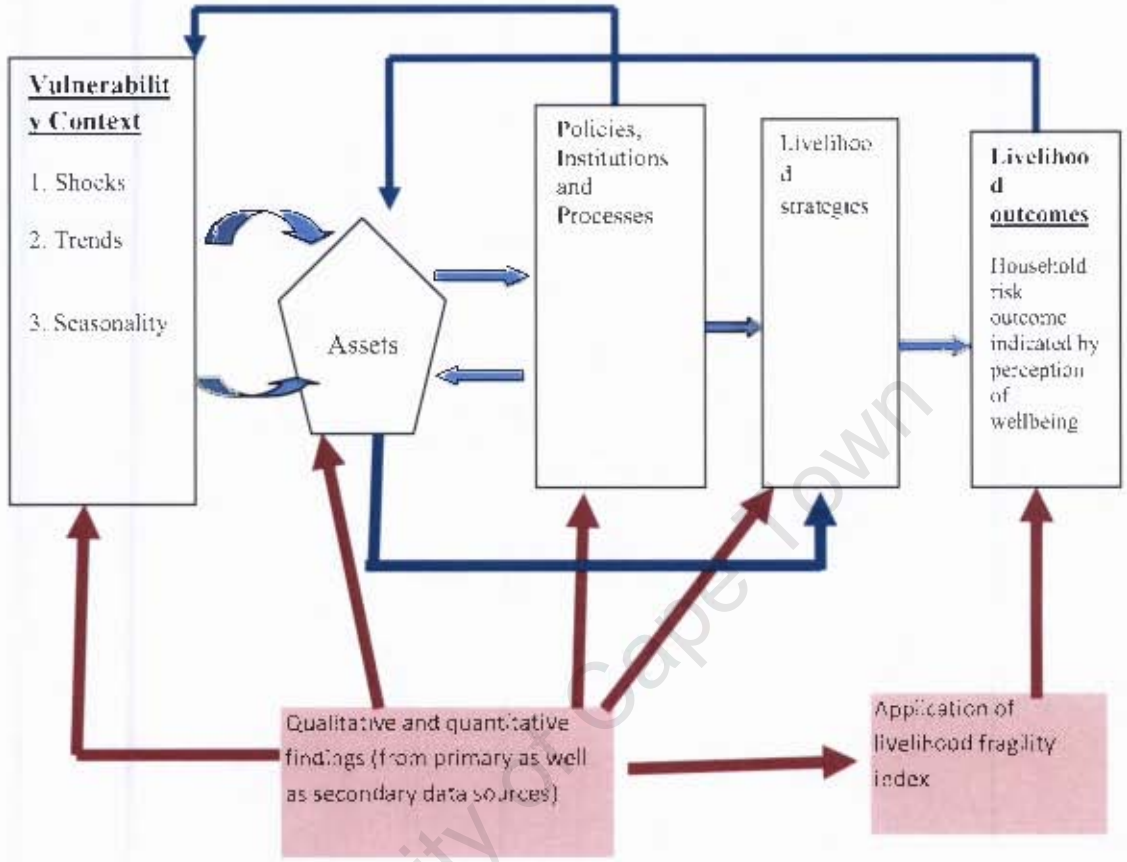
On the other hand, qualitative methods generate detailed, more valid data from the perspective of the subject, not the researcher. This allows subjects to raise issues and topics which the researcher might not have included in a structured research design, adding to the quality of data collected (Duffy 1987).

Therefore, this study has employed a combination of qualitative (which involved key informant interviews, focus group discussions, observation and photography) and quantitative techniques (structured household questionnaires).

Specifically, quantitative methods that employed structured surveys were important in quantifying household livelihood profiles. They also allowed an investigation of the relation between livelihood profiles and food security statuses of households as well as the differences in income level, food security and wellbeing status between different groups of people (such as female-headed compared to male-headed, households with heads of households in different age groups, households living in different resettlement sites visited etc).

The qualitative techniques were important in understanding what problems the resettled households experienced and how they have been coping with such problems, what the complex local realities were, the dynamics of vulnerability of the resettled households, and the way the resettled people were adapting to life in the new environment. Moreover, as Silverman (2004) points out, the qualitative technique enabled the researcher, by minimising his subjective thinking so that he could identify previously unnoticed phenomenon by which to understand the realities in the community. Both approaches are integrated using the livelihoods framework, as indicated in Figure 9, in order to examine the livelihood risk outcomes in the resettlement sites and informed the development of the livelihood fragility index.

Figure 9: Integrated methodological approach of the study



Source: Adapted from DFID (1999)

4.10 Summary

The chapter addressed the data collection process and method of data analysis. It outlines the stage followed from the preparation of tools for data collection to the methods used for data analysis. It provided detailed discussion of the qualitative and quantitative methods used to collect the data including the preparation of tools. It presents the process of determination of sample size and selection of sampled households as well as selection of research assistants. It also described the data consolidation process and the quantitative and qualitative methods of data analysis used for the study.

CHAPTER FIVE
STUDY FINDINGS:
VULNERABILITY CONTEXT AND PROVISION OF INSTITUTIONAL SUPPORT

5.1 Introduction

This chapter presents the findings relevant to the vulnerability context and institutional support components of the livelihoods framework. By drawing substantially on secondary information sources, key informant interviews, participant observation and survey methods, it reveals the district's exposure to shocks and stresses. It also describes what government resettlement support was provided, particularly with regards to the provision of essential services in each of the resettlement sites.

5.2 Shocks and Stresses at District Scale

5.2.1 Risks officially profiled in Metema district

The disaster risk profile of Metema district is diverse, reflecting both natural and human-induced threats. This is reflected in ten primary hazards being identified by the Livelihoods Integration Unit in DPPA at federal level from 1994 to 2007. The impact of each of the hazards, the year of the events and the responses are summarised in Table 6.

Table 6: Recorded disaster events in Metema Woreda (1994-2007)

No	Hazard	Years	Recorded Disasters
1	Heavy rain	May 1994, October 2001	-1994: 10 houses, 3 offices and 1 school destroyed -2001: 570 hectares of crop destroyed
2	Drought	1995	Food aid: 600 people
3	Meningitis	2001, 2002, 2005	-2001: 17 cases, 8 deaths - 2002: 100 cases, 17 deaths -2005: 1 case
4	Fire	April 2002	Houses of 38 households destroyed at total estimated cost of Birr 100,000
5	Kala-azar (Visesral Leishmaniasis	2004, 2005, 2006, 2007	2004: 30 cases and not specified for other years
6	Malaria	2005	Endemic in the district but in 2005 it affected all Kebeles in the district
7	Floods	2006	966 cases, 1 death; 17 livestock lost and 398 hectares of crops damaged
8	Haemorrhagic Septicaemia	March 2007	50 livestock were affected, from which 10 died.
9	Acute watery diarrhoea	April 2007	Affected health of 3708 people, of whom 59 died, which is a 1.6% case fatality rate
10	Locust infestation	2007	Crop failure: 1322 hectares belonging to 28 investors.

Source: Livelihood Integration Unit at Federal DPPA (December 2008), compiled by the researcher

In addition, pest infestation, livestock disease and malaria are the recurring problems affecting agricultural productivity and human wellbeing. The DPPA also identified waterlogging as a major problem, affecting crop production due to the soil characteristics, high intensity of the rainfall and district's flat topography. Bird attacks on crops and wild animal attacks on crops, livestock and people were also highlighted because many farms in the area are surrounded by trees.

5.2.2 Health risks and vulnerability

Focus group and key informant interviews with health workers profiled malaria, then water- borne diseases (diarrhoea), as major concerns. Respiratory tract infections (pneumonia and bronchitis), intestinal parasites and TB were also identified as health concerns. According to interviews with the health assistant, malaria affects everyone. However, children and adult males are affected by diarrhoea and respiratory tract infections respectively. This was attributed to exposure to contaminated water due

to children playing in the fields, and in the case of respiratory infections in males, due to exposure to dust from agricultural work.

Survey results revealed that at least one of the family members had been affected by malaria in the 12 months prior to the survey in 76.7% of the sampled households. The sampled households also reported four deaths since they resettled in the area (at the age of 60; 50; 15 and 5) due to malaria. Unfortunately, there were no data found at the health posts on mortality and morbidity.

5.2.3 Threats to agricultural production and livelihood

The two pervasive natural threats to agricultural production in Metema district are waterlogging and invasion by striga weeds (locally called "Akenchira"). Focus group interviews profiled waterlogging as a problem in times of high rainfall, mostly in August.

Waterlogging

The risk of crop failure due to waterlogging is attributed to five risk factors. These include the district's exposure to highly variable and unpredictable rainfall patterns (from 500 mm to 800 mm), linked to inappropriate cultivation practices. Although sesame and sorghum production levels are reportedly high under normal rainfall conditions, heavy rainfall is particularly damaging to sesame.

Crop exposure to heavy rain was further exacerbated by lack of access to seasonal forecast information (only three households respondents across all sites owned radios and only one owned a television).

According to the key informant at the district's Agricultural and Rural Development Office, farmers do have options to grow crops suitable for high and low rainfall patterns that would avoid crop failure. He explained that rice is a viable crop for lands exposed to waterlogging. Conversely, sesame, which requires little rainfall, is an option for drier periods. However, as the survey shows, none of the sampled households grows rice. Focus group discussions indicated two other important reasons why farmers were motivated to grow sesame despite its exposure to heavy rain and likelihood of failure. Firstly, as past years' trends showed, sesame could be sold for a higher price compared to other crops. Secondly, as rice is not commonly cultivated, nor is a dietary staple in Ethiopia, the resettled as well as the host community are not accustomed to it. In this regard, when participants were asked why they did not try

to grow rice when the area is repeatedly exposed to water-logging, they explained that the crop was unfamiliar to them.

An additional risk factor for waterlogging was lack of utilization of appropriate farming technologies. For instance, the key informant from the Agricultural and Rural Development Office explained that few households used the Broad Bed Maker (BBM) farming tool, which was being sold in his department at a price of between Birr 45 and Birr 90. However, survey results indicated that respondents either had no idea about BBM or viewed it as not strong enough for ploughing waterlogged land.

Striga weed infestation

Regarding the striga weed, the focus group participants reported that it is difficult to remove as it is widespread, and the herbicide that they bought from the Agricultural and Rural Development Department was not effective. Weeding was not effective as it grew back within a few days. As a result, production, especially for sorghum (which is easily affected by weeds) is below expectation. According to the regional Bureau of Agriculture (BoA 1997), as cited in Berhe (2006), yields from farms infested by the striga weed could be reduced by 50% or more.

This quote from one of the focus group participants at Kumer illustrates the effects of water-logging and of the striga weed.

In this season (year 2007/2008), I ploughed six hectares of land including four hectares of rented land from the host community. However, there was unexpectedly heavy rain in the area in August, which waterlogged the cultivated land. In addition, the striga weed was serious in the season. Consequently, the sesame I planted on four hectares was totally damaged and I only got seven quintals of sorghum. Now I have to pay six quintals of sorghum for the rent. Hence, I will have nothing left for the coming months and no more food aid from the government in our village; my option is to sell my ox and donkey and to look for wage labour.

(Source: Author's field notes, December 2008)

5.2.4 Declining soil productivity

Focus group participants reported that unlike the land in the highlands, the resettlement land could not be cultivated for consecutive years, as it becomes infertile easily due to the shallowness of the soil. In line with this, of the sampled households who did not farm all their land (11 households) in the 2007/2008 harvesting season, six (55%) explained that the land was not productive and needed to be left fallow.

In the area, shifting cultivation has been widely practised by the indigenous inhabitants as well as previous settlers to maintain the fertility of the land. However, those practises are difficult to apply today as only two hectares of land was allocated to each resettled household and also because the population has increased. In addition to this, according to the focus group participants in the area, the use of fertilizer and other technologies is almost non-existent. As a result, the land continues to lose its fertility.

5.2.5 Other constraints/threats

Other important challenges observed in crop production were lower support from child labour and the constraints for women having to be involved in alternative activities due to the harsh environment. Another reported challenge, although it is not a very serious one, was bird attacks, especially on sorghum.

Moreover, unlike in the highlands where most of the crops produced were used for the households' own consumption which the women controlled, there is a reliance on cash crops instead of a semi-subsistence approach (i.e. commercial cropping practices at the resettlement sites). Households need to buy food for consumption by marketing their commercial crops. This has decreased women's control over production. As women focus group participants explained, after selling the crops that have been produced, their husbands use some of the income for alcohol. This was not the norm in their home areas and men at the resettlement sites now drink more beer than before.

5.3 Market and Price trends

Exposure to export price fluctuation

Unlike the highland areas, where households depend on subsistence production, households in the resettlement sites are dependent on the cash crop production of cotton and sesame, which are intended for export. Consequently, they are very vulnerable to price fluctuations in the international market. For instance, in December 2008 (when this study was undertaken) sesame suffered an extreme price decline from around 2400 birr in the previous year to 900 birr per quintal (100kgs). This was attributed to low global market price caused by higher levels of production in competitor countries such as China and India.

Exposure to the increase in the price of traditional staples

The agro-climatic conditions and the soil type in the lowlands of the resettlement sites differ from those in the highlands. This limits the production of traditional staples such as teff, barley and other pulses. While sorghum is the staple grown in the district, it is still necessary to buy other crop varieties for household consumption. Hence, the resettled households are required to sell the commercial crops they produce to buy traditional staples such as teff, which are mainly produced in the highlands and must be transported to the resettlement sites. However, the combined effect of weak market integration between districts, poor road infrastructure and declining per capita production of cereals has increased the purchase price of these imported staples. For instance, focus group participants reported that the price of teff had increased from around birr 450 in 2004/2005 to around 1000 birr in December 2008. Moreover, local prices of most domestic consumption goods such as sugar, food and vegetable oil had increased in line with international trends.

Exposure to opportunistic traders and merchants

The combination of weak market integration, poor transportation services, low institutional support and precarious economic states also exposes households to opportunistic traders and merchants, resulting in the sale of produce at lower prices. This is exacerbated by the absence of appropriate transport services from and to the villages of Das-Gundo and Wodi-Gemzu, which necessitates the sale of produce to merchants with trucks that travel to the villages. This means selling at cheaper prices as household bargaining power is reduced. While focus group participants are well aware that sesame's selling price (as well as sorghum and cotton) increases gradually after harvest, reaching higher prices in May or June,

they prefer to sell their produce (especially sesame) immediately after harvest in December and January. Although this resulted in lower returns, they explained that sesame is an oily crop and that the district's high temperatures caused the crop's weight to decrease significantly over time. In addition, they reported lack of appropriate local storage facilities (see Photo 2).

Moreover, focus group participants explained that production is still very much a 'hand to mouth' affair. Thus households sell immediately after harvest to pay past debts; and in some cases to send money for families at home or to pay for transport to visit families at home areas.

Picture 2: A typical way of storing crop products

5.4 Seasonality of Risks/Threats

Seasonal variations in risk and exposure were reported in focus group and key informant discussions. These were reflected in health, hunger, prices and intensity of rainfall. For instance, high rainfall reportedly occurs in July and August. This results in waterlogging, which affects crop production and

access to transport. The occurrence of malaria was reportedly very severe during the months of October and November. The price of agricultural produce is low immediately after harvest in December and January when most of the households are selling their produce to pay past debts or send to their relatives to home area. The price starts increasing thereafter, reaching a high in May and June when households exhaust their own harvests and begin to purchase food for their own consumption. The difficult months in terms of access for food were from June to October. The duration of the hunger season in any year however, depended on the previous season's production.

Crop planting takes place in June and July. Households usually preferred to plant sesame as they are attracted by the relatively higher selling price. However, if heavy rainfall occurs at the end of July and August they replant *teff*, which is a traditional staple suitable in high altitude areas.

Table 7 provides a seasonal calendar for the area that represents the planting season, heavy rainfall, and the seasonality of low and higher prices in relation to crop selling months for households as well as the malaria and hungry seasons for households.

Table 7: Seasonal calendar for multiple exposure conditions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainy season												
Heavy rainfall (sesame crop waterlogged)												
Seasonal rivers are dry												
Planting season												
Replant teff												
Harvesting												
Sell sesame and other crops												
Low price of crops												
High price of crops												
High prevalence of malaria												
Hungry season												

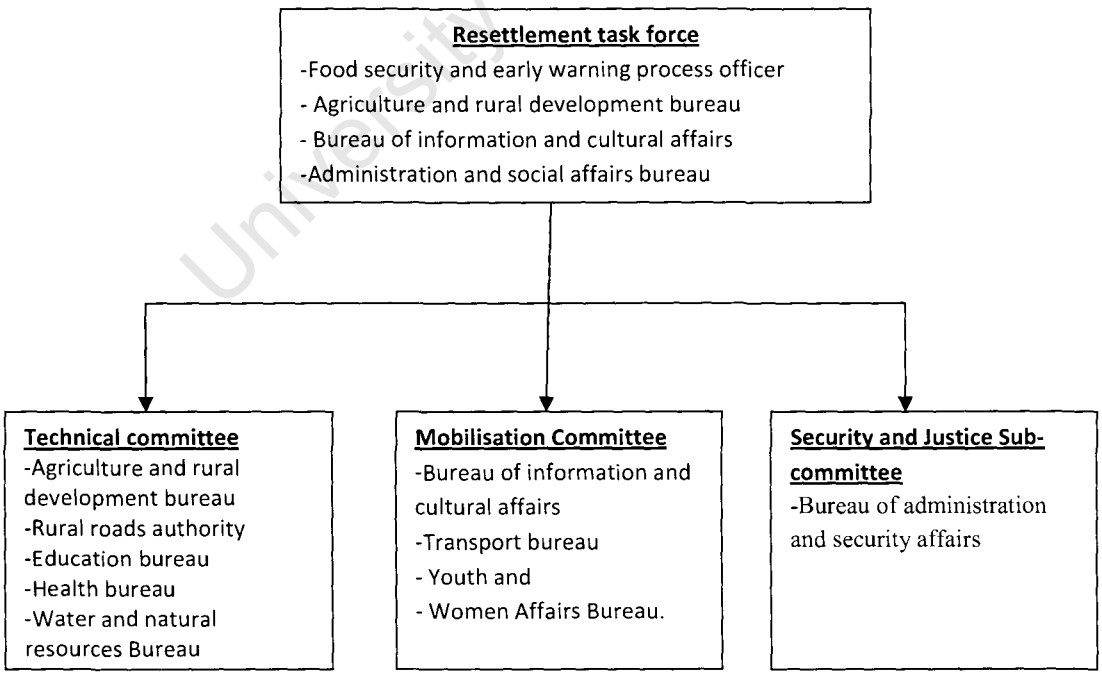
Source: Field research 2008

5.5 Government Resettlement Support

5.5.1 Institutional arrangements for resettlement support

The food security and early warning process officer reported that there was no separate or constituted official authority to implement the district's resettlement programme. However, he reported the existence of a loosely-configured resettlement task force headed up by a committee led by the district chairman and three sub-committees, i.e. technical, mobilization and logistics, and security and justice. These committees are responsible for different aspects of the programme, and were established prior to its implementation. The main committee has members from the Agriculture and Rural Development Bureau, the Information Bureau, the Finance and Economic Development Bureau, the Administration and Social Affairs Bureau as well as the food security and early warning process officer. While these loose groupings were responsible for giving direction and for monitoring the programme based on periodic reports, they have no direct implementation authority or budget. The structure is shown in Figure 10 below.

Figure 10: Structure of the Metema district resettlement task force



Source: Metema district food security and early warning process officer

In principle, the technical committee is responsible for: the identification of unoccupied farmlands and its allocation to the resettled households, the identification and allocation of residential areas (500 square metres for each household) and the development of socio-economic infrastructures (health centres, primary schools, roads, water sources, distribution of an ox and distribution of seed).

Similarly, the mobilization committee is required to disseminate information about the programme to host communities in order to create good relations with the resettled community. It is also responsible for mobilizing the host community in the construction of temporary houses for the resettled and to provide information about the conditions of the resettlement area for the resettled households.

The security and justice sub-committee is responsible for coordinating the security issues in the resettlement area. It is tasked with providing training and organising community members to keep the area safe.

5.5.2 Challenges at district level in providing resettlement support

Metema's food security and early warning process officer acknowledged numerous challenges and problems, particularly in the implementation of the resettlement programme in 2002/2003. This was attributed to poor communication between the district's sub-committees as well as with the task forces at the sending districts at both the zone and regional level. This resulted in a shortage of seed and land, the late distribution of oxen and delays in provision of the budget. Land shortage was due to the fact that the size of the land identified for distribution was simply an estimate. This was reportedly addressed by clearing forests.

Evidence of poor institutional preparation is reflected in the District Task Force Report (2005). This describes how 419 households, comprising 493 household members, were sent from the Bugina and Ziquala districts early on in the scheme and before the district was adequately prepared. During focus group discussions at Das-Gundo, the hosts reported that initially there were adequate consultations with the community and that the community had participated in the identification of unoccupied land for the resettled. However, during the implementation process some of their land had been distributed to the resettled; in some cases this had been distributed with cotton still growing in the fields that was

to be harvested late in January. While this could have resulted in confrontation between the host communities and the resettled families, such conflict did not occur. This was attributed to the absence of agricultural activities (land preparation) during January in the resettlement sites, which allowed the host farmers to harvest their cotton prior to releasing the land to resettled households. In addition, reportedly the land was redistributed from those who already had large landholdings. A further enabling factor was the shared history and social origin between the host and resettled families. For instance, most of the host communities were originally from the sending districts and had resettled either spontaneously in the past 30 to 40 years or through government schemes in the previous regimes, so they understood the predicament of the resettled households.

5.5.3 Primary support provided

Focus group participants in all sites revealed that they received the necessary utensils and agricultural implements. They also reported receiving food rations of 20 kilograms of wheat and 11 birr per person per month as cash stipends for the milling of their rations and to cover other necessary expenses during the first eight months (i.e. until the first harvest). In addition, they initially received free medical treatment, and the transport process from the home area to the resettlement sites was reportedly good.

Some households also received an ox (a cash equivalent of 1000 birr) that was to be paid back in three years; others received 135 birr cash to pay for renting an ox to plough their land with the understanding that this was to be paid back in one year. However, focus group participants reported that as most of the oxen provided were very weak, these died just before the start of their first cultivation. Furthermore, as the oxen had been bought from the highlands of North Gonder they were not adapted to hot conditions in the lowlands of Metema. Moreover, the process of oxen distribution was delayed in the first year of the programme (oxen were distributed only after the land preparation and cultivation season).

5.6 Provision of Essential Services

Access to social services such as health, education, roads, water, and the like at the resettlement sites, and the provision of institutional assistance, has been reported as important preconditions for successful resettlement (Cernea 2000). Empirical evidence documented in different studies (Sewonet 2003; Pankhurst 1992) showed that the resettlement programmes of the 1980s in Ethiopia had not only failed but also caused disruption. This was due to the fact that the government relocated households before establishing appropriate social services in the resettlement areas, and this was combined with poor provision of financial and technical assistance.

This section describes the access to different social services and the institutional assistance that was provided to the resettled at the three resettlement sites. It also compares the levels of service across the three sites.

5.6.1 Housing

Focus group participants in all the three sites reported that on arrival they were allocated houses constructed out of wood and straw. As these were reportedly too small to accommodate all the household members, most of the households had reconstructed their houses by themselves using wood and grass collected from surrounding areas. Field observations indicated that almost all of the houses in the resettlement sites, regardless of the household's economic status, were constructed of wood and thin mud walls and had thatched roofs –features that were better suited to hot temperatures.

Picture 3: Housing conditions in Wodi-Gemzu

5.6.2 Health services

It was observed during field work that health posts, which provide primary health care, exist in two of the three resettlement sites visited (Das-Gundo and Wodi-Gemzu) and were reported as free for the resettled.

Although there was no health facility in Kumer, the site is close to the district centre and other kebeles which have access to clinics. Therefore, it was possible for households to use the clinic at Kokit Kebele (7 km away or two hours return by foot, or shorter using transport).

While the health post at Das Gundo was staffed by two health assistants, they reportedly had only one year of vocational training. Moreover, the clinic was not fully functional or supplied with sufficient medicine and health kits.

Although Wodi-Gemzu's health post had originally been staffed with two to three personnel, only one health assistant was employed at the time of the field visit. Focus group participants also noted that the health assistant had not been in attendance for the past three months, and even when he was present, the health post lacked medicine most days. The researcher noted that the health post was closed and that the structure itself was of poor quality–it was made of wood and straw, with a thatched roof and plastic. It was reportedly constructed by the community residents themselves (see Picture 3).

Picture 4: Health posts at the resettlement site (left at Wod-Gemzu and right at Das-Gundo)

5.6.3 Primary education

Field research confirmed the presence of primary schools in all three-resettlement sites. Grade levels ranged from 1-4 (Wodi-Gemzu), 1-6 (Kumer) and 1-8 (Das-Gunda). Focus group participants reported that the school at Wodi-Gemzu was constructed by labour contributed by the community and was very poor (see Picture 5 below). However, the school was allocated two hectares of land to be cultivated by the community or rented out to an individual farmer. This was to support income generation to cover operating costs such as stationery.

Picture 5: School conditions (the left side is Wodi-Gemzu and the right Das-Gundo)

5.6.4 Access to water for domestic and livestock consumption

Access to water was a critical element for sustaining life in all the resettlement sites, with households reportedly collecting drinking water from rivers, streams and rarely from hand pumps. The perennial river in Wodi-Gmezu is used for watering of livestock and domestic consumption. However, the rivers nearest to Das-Gundo and Kumer resettlement sites were reported to be seasonal. Although hand pumps were observed in all three sites, most of these were broken and not functioning due to poor maintenance. Likewise, although motorised pumps were observed in all sites, these too were not functional.

In Wodi-Gemzu focus group participants reported the presence of nine hand pumps for sourcing potable water. However, only one of these was working at the time of field visit as the rest had been washed away and destroyed by heavy rains in previous years. Similarly, it was reported that the motorised water pump had never worked as no one was responsible for maintenance and the community representatives had no idea who to approach to address the problem. Furthermore, even though residents reported a willingness to contribute money to cover its operating costs, there was lack of institutional support for training or transfer of responsibility. Almost all survey respondents reported that they used river water for household consumption as it is located near to the village, requiring on average a 20 minute walk to fetch water.

In Kumer, focus group participants reported the presence of five hand pumps, and one motorized pump. However, at the time of the field visit, only two of the hand pumps were functioning and the researcher observed many households fetching water from streams and the seasonal river adjacent to the settlement (see Picture 6 below). Survey data also revealed that most households used water from a stream and river for domestic consumption due to the proximity to the settlement and a round trip collection time of 13 minutes.

Households at Das-Gundo have resettled close to but on two sides of an earlier resettled community. The researcher observed that only one of the two hand pumps were functioning, requiring many people to queue until 7 pm to fetch water (see Picture 6) on one side of the settlement. On the other side, three hand pumps and one motorized pump were noted, although only one of the hand pumps was functioning during the field visit. Focus group participants reported that as the motorised pump functioned minimally due to maintenance problems, they used the hand pump, stream and river water for their consumption. The average time taken to fetch water in this resettlement site was 18 minutes.

Picture 6: Water sources for consumption (from left, Kumer, Das-Gundo and Wodi-Gemzu)

5.6.5 Credit service

Access to formal banking and micro credit services

Formal banking services were provided only at district level in Metema and were completely inaccessible to those in the resettlement sites. With specific reference to micro credit, the Amhara Credit and Saving Institution (ACSI) (owned by the ruling party of the Amhara region state) is the only officially recognised provider of credit and saving services for the resettled households. According to the information at the ACSI Metema sub-branch, 879,000 birr has been distributed since 2003 for 586 resettled households, with each receiving 1, 500 birr.

The procedures for accessing micro credit through ACSI require borrowers to self-select members and form a group of five to seven people who know each other well. Ideally a credit and saving committee from the village should recruit and evaluate these prospective borrowers. However, in the case of the resettlement sites, the absence of strong social ties and weak local administration had resulted in the Agriculture and Rural Development Bureau at the district level stepping in to screen and recruit potential borrowers instead of a local credit and saving committee

Another obstacle to access credit explained by this key informant was that the resettled households had misunderstood the financial implications of the oxen they received (or financial equivalent of 1000 birr) from the Agriculture and Rural Development Bureau. As the settlers had perceived this as aid rather than as a soft loan, they did not pay it back, which now disqualified them from access to credit.

Moreover, the weak social ties among resettled families meant they did not know each other sufficiently well to trust each other enough to form a group. These observations were confirmed by focus group participants who noted that it was difficult to take credit on a group basis, as one could not be sure who was stable enough to 'stay the time' at the resettlement site.

Informal sources of credit

While it is recognised that non-formal sources, such as "Iddir" (burial groups), "Iqqub" (rotating saving) and "Mahaber" (feasts), as well as relatives and moneylenders, play a significant role in providing credit for poor rural Ethiopian households, focus group participants in all the sites confirmed that these informal institutions were not yet established, and only Iddir, which primarily focuses on providing funeral services, was operating in Wodi-Gemzu.

5.6.6 Access to agricultural extension services

One of the main objectives of the resettlement programme was to enable households to be food secure and to improve their livelihoods. In this regard, effective and efficient agricultural extension support has paramount importance in helping the resettled households to adapt to their new environment and to acquire knowledge and awareness of how to carry out agricultural practices. In the case of Metema, the agricultural system and the lowland environment were unfamiliar to the resettled families. Therefore, ample support was needed to enable households to adapt to an unfamiliar agro-ecological context.

However, focus groups uniformly revealed poor support from extension workers, who were supposed to inform them about appropriate farming practices for the area. Focus group participants at Wodi-Gemzu reported that the visits and consultations from extension workers were primarily made to households that were 'better off' or for selected model farmers. They also reported that agricultural extension workers had not been available at their assigned resettlement site. The researcher also observed this and could not locate any agricultural extension worker to interview in any of the three resettlement sites, as they were not in the area during the the fieldwork.

The key informant at the Metema district agriculture and rural development bureau explained that there were supposed to be three agricultural extension workers (or development agents) in each of the rural kebeles and that they were supposed to be trained in different areas, such as crop cultivation, natural resources protection and conservation, and animal husbandry. However, he admitted that the district had insufficient extension workers to undertake enough supervision and consultation in all the kebeles of the woreda; this was coupled with a high turnover of workers. However, he mentioned that to solve the problem, professionals at the woreda agriculture office usually undertook field visits and held group consultations in many of the rural villages, especially from January to March. Unfortunately, during this period, a significant number of households moved to their home areas for prolonged visits to their family, or in rare cases moved to the commercial farm areas of the Woreda and the neighbouring Sudan to generate income as hired labour.

5.6.7 Access to markets and transport services

The researcher observed that only Das Gundo has a local market, and the other two sites used the nearest markets in other kebeles for the sale and purchase of goods. According to the survey, the average time taken for a return trip on foot to the nearby market was 23, 114 and 308 minutes respectively for Das-Gundo, Kumer and Wodi-Gemzu resettlement sites.

Among the three sites, Kumer fared better in terms of transport services as it is located along the main road to Sudan near to the capital town of the district, Shehedi. Thus, as discussed in the focus group interview, access to transport and the market is not a problem, and it takes about 30 minutes to get to the market and to return home using transport. On the other hand, the focus group participants at Wodi-Gemzu reported that the nearby market was located 25 kilometres from their village and transport service was not available except by tractor and by truck when merchants came to buy and collect sesame during the harvest period of December and January. In addition, they noted that it is difficult to walk to the nearby markets during the rainy season since there are no bridges to cross the rivers (especially the Guang River) when they are full.

5.6.8 Essential services: consolidated findings

The findings on essential services show extremely low levels of service provision across the sites, as summarised in Table 8 below. However, the ranking exercise presented in Appendix 5 shows differences in service provision; Wodi-Gemzu with very poor service provision compared to the other sites in aggregate terms.

Table 8: Summary table showing availability of essential services in the three resettlement sites

Essential service		**Resettlement Sites**		
	Sub indicator	Wodi-Gemzu	Das-Gundo	Kumer
Housing	Houses constructed out of wood and straw			
Health	Health post			No
	Physical condition of health post	Very poor	Better	Closer to the district Town. So better access to health services
	Health staff	1	2	
	Availability of medicine	Poor	Poor	
Education	Primary school	Up to grade 4	Up to grade 8	Up to grade 6
	Physical condition of school	Very poor	Better	Better
Water	Hand pump	1 out of 9 was working	2 out of 5 were working	2 out of 5 were working
	Motorised pump	There was but it was not functioning	It functioned for very limited time a year	There was but it was not functioning
	Streams (perennial)			
	River		Seasonal	Seasonal
Credit	Formal	Poor	Micro finance institution	Micro finance institution
	Informal	Only *Iddir*	Not yet	Not yet
Road to district		Very poor	Seasonal	Asphalted
Agricultural extension		There were no extension workers	Reportedly there were three. But were not available for interview	Reportedly there were three. But were not available for interview
Total*		Very poor	Poor	Adequate

Note: *Based on the ranking exercise result for all the services (See Appendix 5)

5. 7 Summary

This chapter has addressed the vulnerability context in Metema district consolidating information primarily from secondary and qualitative sources. It has also provided comparative evidence of the provision of essential services in each of the resettlement sites.

Findings indicate a complex vulnerability context characterised by a diverse combination of naturally occurring threats including waterlogging, striga weed infestation and malaria. It also underlines the exposure of resettled households to market related trends and forces due to dependence on cash cropping and export-related price volatility. The findings also profiled the poor quality of almost all essential services, especially those at Wodi-Gemzu.

CHAPTER SIX
DESCRIPTIVE FINDINGS: HOUSEHOLD SOCIO-DEMOGRAPHIC AND COMPARATIVE LIVELIHOOD PROFILE

6.1 Introduction

This chapter describes the demographic and livelihood profiles of the sampled households. It is divided into five major sections. The first section presents the social and demographic characteristics of the sampled households; the second examines the extent of the 'voluntary-ness' of the resettlement programme and the reasons why households were resettled; the third section discusses household asset profiles; and the fourth section covers the livelihood strategies of households. The final section presents the livelihood outcomes that the households achieved at the resettlement sites.

6.2 Socio-Demographic Profile of Study Sample

6.2.1 Demographic characteristics of sampled households

Gender and age of head of household

Table 9 below shows the demographic characteristics of the sampled households. This table indicates that 87% of the households are headed by males. The average age of the household heads was 40.76 years, with a minimum age of 23 and a maximum age of 69 (S.d 12.23). Most of the household heads (77.42%) were in the age groups of 20-35 and 36-50, which constitute 39.78% and 37.63% respectively. Only 5.38% of household heads were 66 years and older. There were differences in age distribution between the three sites. Most of the household heads (64.5 %) in Wodi-Gemzu were in the age group of 20-35, while the majority of the household heads (41.96 and 48.39% respectively in Das-Gundo and Kumer) were in the age group of 36-50. The survey further revealed that 83% of the female heads of household were aged between 20 and 50, as compared to 63% for their male counterparts. The average age of female heads of households (46) was slightly higher than those of the male household heads interviewed, which was 40 years.

Educational Status of head of household

With regard to education, the majority (69%) of household heads interviewed had never attended school, while 14% had only a primary education and only 2% of the respondents had a secondary education. The rest (15%) of the head of households could read and write.

Marital Status

With regard to marital status, Table 9 shows that most of the household heads interviewed (80%) were married; the other 20% were divorced or widowed or had never married. The surveys also showed that the majority of female heads of households interviewed (92%) were single, as compared to only 10% for male heads of households interviewed.

Table 9: Demographic characteristics of the sampled households

Demographic Characteristics	Resettlement sites							
	Wodi-Gemzu		Das-Gundo		Kumer		Total	
Gender	**31**	**100**	**31**	**100**	**31**	**100**	**93**	**100**
Male	29	93.55	27	87.1	25	80.65	81	87.1
Female	2	6.45	4	12.9	6	19.35	12	12.9
Age	**31**	**100**	**31**	**100**	**31**	**100**	**93**	**100**
20-35	20	64.52	10	32.26	7	22.58	37	39.78
36-50	7	22.58	13	41.94	15	48.39	35	37.63
51-65	3	9.68	6	19.35	7	22.58	16	17.2
>65	1	3.23	2	6.45	2	6.45	5	5.38
Marital Status	**31**	**100**	**31**	**100**	**31**	**100**	**93**	**100**
Married	22	70.97	26	83.87	26	83.87	74	79.57
Never married	4	12.9	4	12.9	4	12.9	12	12.9
Divorced	3	9.68	0	0	1	3.23	4	4.3
Widowed	2	6.45	1	3.23	0	0	3	3.23
Education	**31**	**100**	**31**	**100**	**31**	**100**	**93**	**100**
No education	22	70.97	18	58.06	24	77.42	64	68.82
Read and write	4	12.9	7	22.58	3	9.68	14	15.05
Primary	5	16.13	5	16.13	3	9.68	13	13.98
Secondary	0	0	1	3.23	1	3.23	2	2.15

Source: Author's own survey data 2008

Household size

The average family size for the sampled households was found to be 3.93 people with a maximum of eight and a minimum of one person per household. The average household size was slightly less in Wodi-Gemzu (3.2 persons) as compared to 4.1 and 4.5 persons per household in Kumer and Das-Gundo respectively. In addition, as indicated in Table 9, a slightly larger number of household heads at Wodi-Gemzu are single, as compared to the other two sites. The average household size is almost the same for male and female heads of households (3.83 persons per household for female-headed households and 3.93 for male-headed households). The survey further indicated that the sampled households have an average of 1.78 dependents (i.e. under 15, over 65 or disabled), with a maximum of five in any one household.

6.2.2 Resettlement experience of study sample

Almost all the sampled households were from the Amhara ethnic group. Although only three respondents were of Agew ethnicity, they also spoke Amharic. The sampled households originated from 16 districts of the Amhara regional state, mainly from the South Wollo, North Wollo and Waghimra zones (zones that are located more than 600 kilometres away from the resettlement sites). The exception was the Gayint district, which is located in South Gondar, approximately 350 kilometres from Metema.

Across all sites, the survey findings indicate that 47.31%, 10.75% and 41.94% of the sampled households resettled in 2002/2003, 2003/2004 and 2004/2005[10] respectively.

Das-Gundo and Kumer

Das-Gundo and Kumer are relatively established resettlements sites, where households from the highland parts of Amhara and Tigray regional states have been living for many years; they were resettled either spontaneously or by government-promoted resettlement programmes during the Imperial as well as the Derg regimes. Survey results indicate that 81.5% and 63% of the sampled households in Das-Gundo and Kumer respectively arrived in the first round (the year 2002/2003) of the resettlement programme. The rest, 18.5% and 37% of the sampled households in Das-Gundo and Kumer respectively, were resettled in 2004/2005.

[10] In the Ethiopian calendar, September is the beginning of a new year; the calendar years are eight years back from January to August and seven years from September to December from the Gregorian calendar. For instance, January 2009 in the Gregorian calendar is January 2001 in the Ethiopian calendar; and October 2009 in Gregorian is October 2002 in the Ethiopian calendar.

Wodi-Gemzu

According to the focus group participants and the district key informant, Wodi-Gemzu is a relatively new village which formerly was sparsely populated. Very few people who came from the highland areas resettled spontaneously; they were dispersed around the site by herding livestock and practising shifting cultivation. Officially-supported resettlement occurred in the second round (2003/2004). The majority of the sampled household heads (68.4%) reported that they resettled in 2004/2005, with 31.6% resettling in 2003/2004.

6.3 'Voluntary-ness' and Reasons for Resettlement

Many researchers view voluntary participation to be a significant determinant of the success of any resettlement programme. In this regard, Erlichman (2003) in his study titled *Ecohealth and Displacement* (a case study of resettlement and return in Ethiopia) stated that:

The degree to which the choice to resettle was voluntary affected an individual's willingness to adapt. Adaptation was easier in the cases where households had a greater degree of freedom to resettle (as opposed to cases where people were simply assigned to resettlement by the Peasant Associations).

In this study, all of the respondents interviewed confirmed that they had participated voluntarily in the resettlement programme. According to the key informant (the food security process officer) who was interviewed at the Amhara Regional State Food Security Coordination and Disaster Prevention office, the resettlement programme was initially a response to the spontaneous movement of people from the highland parts of the region to the lowlands. Even though resettlement later became one of the three important food security strategies of the government at the end of 2002/ 2003, people had been expressing their desire to be resettled for several years. In some areas, people had already begun to move on their own without government assistance. A large number of people (about 31,515 people) had been resettled with government assistance before 2002/2003 to the lowlands of the region.

Although the government advertises the programme as voluntary, and the respondents confirmed that they had been resettled voluntarily, focus group interviews and household survey results showed that there were some push and pull factors that induced households to choose resettlement as an option.

6.3.1 Push factors

When the researcher asked the sampled households as well as focus group participants for their reasons for choosing resettlement, their reply was either that they were landless, or that they had small landholdings, or that drought and environmental degradation as well as limited availability of non-farm and off-farm income sources were factors in their decison. For instance, one of the focus group participants at Wodi-Gemzu resettlement site who originated from Meket district, North Wollo zone, has five household members. His reasons to resettle are below.

Drought occurs almost every two or three years at my home area, the productivity of the land is getting low, the land I had was very limited (half hectare) and is infertile. Therefore, I could not grow enough crops to feed and support my household members. Moreover, wage labour and other sources of income were very limited in our area. Therefore, the only option for many households, including me, was to wait for aid from the government. So I chose to register for the resettlement programme to come here when the Woreda and Kebele officials announced about the benefits of getting two hectares of land, and other supports hoping that I can be self sufficient in my food requirement and for a better life. Of course, I am now self sufficient and living without aid, but the environment is very hot and I miss my home place very much.

(Source: Author's field notes, December 2008)

The other group participant in the Kumer resettlement site, who came from Sekota, Waghimra Zone, has two children aged 5 and 2. His reasons are quoted below

I was too young to be given farm land when the present government redistributed land after the fall of the Derg regime. My parents received about one hectare of land and they could not give me part of their land when I got married in 1999 as they had four other children. Therefore, I had been living with my parents since 1999, even after I got married. In addition, alternative means of livelihood are very limited in the area. In short, life in general was very difficult at my home area. Hence, I was happy to register and be resettled, when the government officials told us about the programme. I was keen to establish my own household, to be self sufficient and improve the life I had been living for many years by receiving land independently in the resettlement area.

(Source: Author's field notes, December 2008)

The conditions in the home areas of the resettled are important push factors. This was supported by the secondary information found in the Metema Woreda's 'Resettlement Task Force' report

(January 2005), written in Amharic. The report indicates that out of the 13,000 households targeted to be resettled in the Woreda in 2002/2003, 12,777 were resettled (98% of the resettlement target). However, in the following year, according to the same report, 2,243 households out of the planned 15,000 were resettled (15% of the target). This low rate was attributed to high crop production in all parts of the region as a result of good rainfall distribution in that production year.

6.3.2 Pull factors

Focus group participants also reported "pull factors", including misleading information disseminated by some of the woreda and kebele officials about the conditions in the resettlement areas and about support that would be given.

Of these groups, some left the resettlement sites immediately after reaching them when they found that the environment was hot and harsh compared to their home areas. They were annoyed by unfulfilled promises, for instance, the 2000 to 4000 birr stipend, the free oxen and better housing.

6.3.3 Return to original areas

Returns were reported, especially from those who resettled in the beginning of the resettlement programme (Metema Woreda Resettlement Task Force Report 2005). Approximately 37% of the resettled households (3,787 household heads including their 1,023 household members from the 2002/2003 resettled households) reportedly returned immediately to their home areas without involving themselves in any activities in the resettlement area. This was not the case for those households who resettled in the later years of 2003/ 2004, as the same report indicated that 97% became involved in agricultural activities from the very first harvest season in the resettlement area. The key informant interviewed (the food security and early warning process officer at the woreda) described how households that resettled in later years had better information and a better understanding of the conditions of the resettlement sites and the programme than the previously resettled households. They had this information before they decided to move to the resettlement sites. The rate of return was low, at least for the first season.

According to the focus group participants, other households had returned home after the first harvest season because the farm land they had received was either water-logged or not fertile enough to support their household members; other reasons were failure to produce enough

because of a lack of skills to adapt to the new agriculture practice, and no access to oxen with which to plough all the land they received in time.

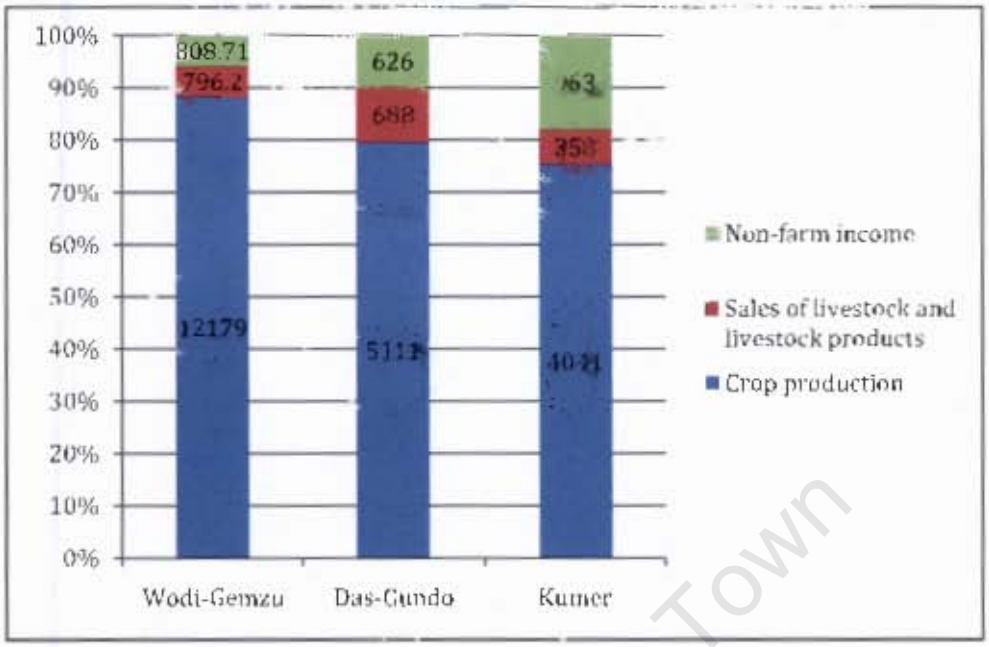
The Metema Woreda Resettlement Task Force Report indicated further reasons that contributed to households returning home. Firstly, some households chose to invest in small trading in their home area after a satisfactory first harvest. Secondly, a dependency syndrome led to some households only using the resettlement programme to receive whatever aid was distributed. Thirdly, rather than believing that the programme would improve their livelihoods, some were scared of not getting aid if they refused to be resettled and in other cases, people were homesick. In line with this, Lakew (2006), in his study focused on food security in Enebse Sar Midir district (one of the sending districts in East Gojjam zone of the regional state), reported that food insecure households had been prohibited from getting relief food aid in a bid to force them to accept resettlement.

6.4 Livelihood Strategies in Resettlement Sites

6.4.1 Role of crop production

Survey findings indicate that crop and livestock production as well as non-farm income are dominant sources of livelihood across the surveyed households (see Figure 11). Crop production specifically accounted for 83.4% of annual income on average. However, Figure 11 also illustrates significant differences in the total annual income between the three sites, with households at Wodi-Gemzu reportedly generating an annual income exceeding 13,000 birr or more than twice of of that of the other two sites. This was primarily attributed to significantly stronger crop production in Wodi-Gemzu, which generated two to three times more to household income compared with crop output at Das-Gundo and Kumer respectively.

Figure 11: Sources of income and their percentage contribution in the three sites (in Birr)



Source: Author's own survey data 2008

Note: one USD was equivalent to Birr 11.1 in January 2009

6.4.2 Livestock as source of livelihood

Although field observations revealed abundant access to grazing land around all of the resettlement sites, survey findings indicated that the annual household income generated through sales of livestock and livestock products only comprised 7.2% on average (614 birr). However, this was reportedly significantly higher than in the districts of origin. Key informants from the district's Rural and Agricultural bureau also highlighted Metema's proximity to Sudan as a valuable livestock exporting opportunity. However, they qualified this by underlining the recurrent exposure to livestock theft. For instance, focus group participants at Wodi-Gemzu reported that 19 of the resettled community's oxen had been stolen in 2007. Similarly, in Das-Gundo it was reported that just one week before the field visit 54 cattle from one host household had been stolen. Focus group participants also noted that theft was a problem because the Sudan border is close to their villages and there is an absence of checkpoints to control livestock movement at the border areas.

6.4.3 Non-farm income as sources of livelihood

With particular respect to non-farm income, a diverse range of activities were identified. These included wage labor, milling, charcoal and wood selling, local alcohol selling, blacksmithing, video shows and caring for other households' cattle. On average this only accounted for 9.37% of the total income on average, however (see Figure 11 above).

Survey results also indicated that 22.3% of the sampled households in Kumer had non-farm income compared with 21.1% and 14.8% respectively for Wodi-Gemzu and Das-Gundo (see Appendix 4). The higher non-farm income observed in Kumer is attributed in part to its proximity to the district's capital (Shehedi) and the border towns of Metema-Yohaness, characterized by high levels of border trade with Sudan. This was verified by the field observation, which indicated more people were engaged in charcoal and fire wood selling than at other sites.

Modest non-farm income generating activities were noted at Wodi-Gemzu. This included two grinding mills owned by the resettled households and one small shop selling oil, tomatoes and other small consumable goods. The researcher also observed a household with its own generator that sold beer and soft drinks. Television/video night entertainment for payment was also offered.

In contrast, the researcher observed no shops or small business activities in the areas in Das-Gundo where the resettled were living. This is attributed to the location of resettled households on the periphery of the former village that was established in the 1960s. Group discussions highlighted significant difficulties for the resettled to practise small trade as they were competing with previous settlers. They also noted that access to labor wages was related to farming, which is seasonal and available only during the weeding and harvesting period.

One unexpected finding with respect to income generated concerned the role of gum and incense harvesting. As noted earlier, Metema is extensively covered with different gum and incense species, and gum and incense harvesting have been identified as major potential sources of income for the resettled through appropriate training and marketing support. This is underlined in the livelihood analysis within the district cited in Hammond and Dessalegn (2003) which estimated that 43.6% of household income could be derived from gum and incense harvesting (see Appendix 4).

However, none of the respondents in this research identified gum and incense harvesting as a source of income. Focus group interviews revealed numerous constraints for resettled families. First, individual households are not permitted to be involved in gum production, even for home consumption, and are required to form a co-operative. In addition, most of the laborers employed

by the companies who are engaged in incense production were reportedly from other areas, so local residents were not hired as daily labor. Furthermore, they were excluded from paid labor due to lack of skills and training in gum production. Therefore, despite the widespread availability of this natural resource, it remains an inaccessible source of livelihood for the resettled households.

6.5 Livelihood Outcomes: Kumer, Das-Gundo and Wodi-Gemzu Compared

6.5.1 Overview

The original intent of the government-supported resettlement programme was to improve the food security of resettled households and thus their overall wellbeing and livelihood status. The household survey also examined these livelihood outcomes from the perspective of the study respondents.

6.5.2 Household perception of food security

As depicted in Table 10, only 24.18% of the sampled households reported experiencing food security problems after resettlement. They reported that, on average, they encountered consumption gaps for 3.88 months a year with a minimum of two and a maximum of six months, usually between May and October. Table 10 also profiles the differences in perceived food security status across the three sites, with 6.67% of households in Wodi-Gemzu reporting periods of food insecurity compared with 23.33% in Das-Gundo and 41.94% in Kumer.

Table 10: Household perception of transitory food insecurity: post resettlement

Perception of food insecurity	Location						Total	
	Wodi-Gemzu		Das-Gundo		Kumer			
	No.	%	No.	%	No.	%	No.	%
Experience food insecurity	2	6.67	7	23.33	13	41.94	22	24.18
No experience of food insecurity	28	93.33	23	76.67	18	58.06	69	75.82
Total	30	100	30	100	31	100	91	100

Source: Author's own survey data 2008

Similarly, Table 11 shows that the majority of households across all sites (83.52%) perceived that they were more food secure post-resettlement. This finding holds constant across the three resettlement sites, even when factors of age of heads of households and female and male-headed households were considered. Moreover, the Chi-2 test in Table 11 (with p-value>0.05) showed no significant difference between different groups of households on perception in food security status.

Table 11 also shows that 8.79% and 7.69% of the households surveyed perceived that their food security was either worse or the same compared to the home areas. Respondents and focus group participants identified waterlogging, striga weed infestation and declining land productivity as the main triggering factors for their food insecurity conditions in the resettlement sites.

The environmental conditions in the resettlement areas reportedly constrained the use of established coping strategies for food insecure periods. For instance, female focus group participants in Kumer noted that in their home areas, in addition to food aid, multiple cropping practices were the most important mechanisms to cope with food insecurity in periods of critical food shortage (usually June to October). They reported that they used to plant cabbage and potatoes because these were fast growing. This strategy could not be transferred to Kumer because the environment was not suited to these crops.

Table 11: Households Perception on their food security status compared to home areas

Food security determinants	Perception (no. of households (%)			Statistical tests	
	Worse	The Same	Better	Pearson chi2	Likelihood-ratio chi2
Location					
Wodi-Gemzu	1(3.33)	4(13.33)	25(83.33)		
Das-Gundo	2(6.67)	1(3.33)	27(90)	5.4 (p =0.248)	5.33(p=0.255)
Kumer	5(16.13)	2(6.45)	24(77.42)		
Gender					
Female	1(9.09)	2(18.18)	8(72.73)	1.96(p=0.374)	1.55(0.461)
Male	7(8.75)	5(6.25)	68(85)		
Age of Head of Household					
20-35	19(2.78)	3(8.33)	32(88.89)		
36-50	5(14.29)	2(5.71)	28(80)	5.3(p=0.505)	5.41(p=0.492)
51-65	2(12.5)	1(6.25)	13(81.25)		
>65	0	1(25)	3(75)		
Total	**8(8.79)**	**7(7.69)**	**76(83.52)**		

Source: Author's own survey data 2008

6.5.2: Household perception of wellbeing: post resettlement

With respect to perception of wellbeing, Table 12 shows that majority of respondents (70.97%) felt that they were better off post-resettlement than they had been in their home areas. This compares with 14% and 15% of households respectively that perceived their living conditions had deteriorated or remained the same. Consistent with findings presented earlier on income and food security, 83.87% of households in Wodi-Gemzu perceived their life to be better in the resettlement site compared with households at Das-Gundo (67.74%) and Kumer (61.29%). While the statistical test with p-value of 0.067 indicated an insignificant difference by location, statistical test (p-value of 0.044) highlighted significant differences in well-being perception by gender. This indicated that more women-headed settlers perceiving they were worse off than male headed households. With regard to age, even though a higher percentage of household heads aged 20-35 perceived their livelihood to have improved compared to home areas, this difference was not found to be statistically significant (p-value 0.254>0.05).

Table 12: Households' perceptions of their wellbeing status as compared to their home area

Determinants of wellbeing	Perception (no. of households (%)			Statistical tests	
	Worse	The Same	Better	Pearson chi2	Likelihood-ratio chi2
Location					
Wodi-Gemzu	3(9.68)	2(6.45)	26(83.87)		
Das-Gundo	4(12.9)	6(19.35)	21(67.74)	5.39(0.067)	5.58(0.061)
Kumer	6(19.35)	6(19.35)	19(61.29)		
Gender					
Female	4(33.33)	3(25)	5(41.67)	6.26(0.044)	5.51(0.063)
Male	9(11.11)	11(13.58)	61(75.31)		
Age of Head of Household					
20-35	2(5.41)	4(10.81)	31(83.78)		
36-50	7(20)	8(22.86)	20(57.14)	7.79(0.254)	8.86(0.181)
51-65	3(18.75)	2(12.5)	11(68.75)		
>65	1(20)	0	4(80)		
Total	**13(13.98)**	**14(15.05)**	**66(70.97)**		

Source: Author's own survey data 2008

6. 6 Summary

This chapter presented the socio-demographic characteristics of the sampled resettled households along with voluntarism in the resettlement programme. It also presented the major livelihood strategies of the resettled and the livelihood outcomes in the resettlement sites.

Findings indicated that almost all the sampled households interviewed shared the Amhara ethnic group. This significantly reduced the potential for ethnic conflict in the resettlement sites with no conflict either observed or reported during field work.

Research findings also showed that households chose to resettle voluntarily. However, 'push' and 'pull' factors induced households to choose resettlement as an option. These included conditions in their home areas such as landlessness, small landholdings, drought and environmental degradation, as well as the limited availability of non-farm and off-farm income sources. In addition, misleadingly optimistic information was disseminated by woreda and kebele officials regarding conditions in the resettlement areas and the government support that would be provided.

In terms of livelihood activities, the research findings indicated that crop production was the main source of income and accounted for 83.4% on average. In addition, the households' non-farm income and income from sales of livestock or livestock products were reported. With regard to livelihood outcomes, the survey result indicated that majority of respondents felt better off post-resettlement in terms of food security status as well as in their general wellbeing.

CHAPTER SEVEN
ANALYSIS OF FINDINGS:
FRAGILITY OF HOUSEHOLD LIVELIHOOD PROFILES
KUMER, DAS-GUNDO AND WODI-GEMZU COMPARED

7.1 Introduction

This study draws substantially on and applies the sustainable livelihoods framework to examine the adaptive strategies of households resettled to the lowland areas of Metema. In this context, it recognises the central role that productive household assets (livelihood resources) play in determining the choice of livelihood strategies in the resettlement sites.

Chapter Five presented findings at district scale on the co-variant threats that were faced by the resettling households in Kumer, Das-Gundo and Wodi-Gemzu. The major external shocks and stresses that undermine household efforts to achieve food security were found to be striga weed infestation, waterlogging, malaria and exposure to price fluctuations.

These shocks and stresses were consistent across all three sites–largely because they all share the same agro-ecology and topography, and because the same traditional farming methods are employed. However, despite this uniformity of external shocks and stresses across all sites, it is also acknowledged the potential for the existence of differences among the households. This is because households with different livelihood resources are not necessarily affected by co-variant risks in the same ways.

This chapter therefore examines the relative fragility of household livelihoods in the three resettlement sites. It does this by applying the livelihood fragility index, which has been developed and described in the course of this study.

7.2 The Household Livelihood Fragility Index Revisited

As described in Section 4.8.1, this study has applied a fragility index rather than a vulnerability index, as it is amore encompassing concept, including both the asset and resource endowments of a household as well as those provided by the broader formal and informal social system. The following section applies the fragility index to five major livelihood asset clusters–namely, access to natural capital, financial capital, physical capital, social capital and household human capital. The relative household fragility of each livelihood asset cluster is also compared across the three sites, and

examined by drawing field observations and qualitative data from key informant and focus group interviews.

7.3 Household Access to Natural capital

7.3.1 Relative fragility in Kumer, Das-Gundo and Wodi-Gemzu

The key components of a household's access to natural capital that informed the index are per capita income from crop production and farm distance from dwelling. When the robustness of the household'saccess to natural capital was examined and compared across the three sites, clear differences become evident. Table 13 shows that 86% and 90% of households in Kumer and Das-Gundo respectively are 'more fragile' in relation to their access to natural capital, compared to 61% of households in Wodi-Gemzu. However, these results also show significant household fragility across all three of the sites, with approximately 80% of all of the households falling into the 'more fragile' category.

Table 13: Households natural capital profile by site

	Sites						Total	
	Kumer		Wodi-Gemzu		Das-Gundo			
Level of fragility	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less fragile	1	3.45	4	14.29	1	3.33	6	6.81
Fragile	3	10.34	7	25	2	6.67	12	13.64
Highly fragile	27	86.21	18	60.71	27	90.00	71	79.55
Total	30	100.00	28	100.00	30	100.00	88	100.00

Source: Author's own survey data 2008

7.3.2 Similarities and differences between sites

The difference in the relative fragility of natural capital between Wodi-Gemzu and the other two sites is due to higher levels of soil fertility in Wodi-Gemzu, due to it being established more recently than the other areas. This was confirmed by the focus group participants in Kumer, who expressed their desire to be relocated to more fertile land in the district. Moreover, Wodi-Gemzu's distance from the district capital has resulted in weak government control and little regulation of the reserved forest and bush lands. This has enabled farmers to cultivate more land than they were

actually given. In addition, focus group participants in Wodi-Gemzu reported that there was abundant rental land available for extra cultivation.

Households across all three sites uniformly reported they had been allocated two hectares of farmland for cultivation (compared to 0.67 hectares of arable land in their villages of origin). Significantly, however, the households all cultivated in excess of two hectares, with Kumer households ploughing 2.7 hectares on average and Wodi-Gezu and Das-Gundo ploughing 2.47 and 2.33 hectares respectively.

The presence of perennial rivers at Wodi-Gemzu, compared to seasonal rivers only at the other two sites, also conferred additional natural benefits for irrigation and domestic consumption purposes.

7.4 Household Access to Financial Capital

7.4.1 Relative fragility in Kumer, Das-Gundo and Wodi-Gemzu

The key components of access to financial capital that compiled the household financial capital index were access to credit and non-farm income sources. Table 14 summarises the index results presented in Appendix 11, and shows that 61% of the sampled households in Wodi-Gemzu are fragile in terms of financial capital, compared to 30% in Kumer and 37% in Das-Gundo. This is attributed to the fact that Wodi-Gemzu is located far from the district's capital. This, along with the fact that transport services are non-existent, limits access to credit services and non-farm income generation.

Table 14: Households financial capital profile by site

	Sites						Total	
	Kumer		Wodi-Gemzu		Das-Gundo			
Level of fragility	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less fragile	2	6.67	0	0.00	1	3.33	3	3.41
Fragile	18	63.33	11	39.29	18	60.00	47	53.41
Highly fragile	10	30.00	17	60.71	11	36.67	38	43.18
Total	30	100.00	28	100.00	30	100.00	88	100.00

Source: Author's own survey data 2008

7.4.2 Similarities and differences between sites

As reported in Chapter 6, household access to credit is uneven across the sites, with only 9.7% of respondents in Wodi-Gemzu receiving credit, compared to 42% and 48.4% in Das-Gundo and Kumer respectively. With regard to non-farm income, survey results revealed that 22.3% of the sampled households in Kumer resettlement area have non-farm income as a supplementary source of income, while it was 21.1% and 14.8% in Wodi-Gemzu and Das-Gundo respectively (See Appendix 4).

Although it was not significant, the slightly higher non-farm income observed in Kumer was attributed to the proximity of the site to the district capital (Shehedi) and the border town of Metema-Yohaness. This allowed households to engage in modest labor wage activities. Field observations also indicated that more people were engaged in charcoal and firewood selling than at the other sites.

7.5 Household Access to Physical Capital

7.5.1 Relative fragility in Kumer, Das-Gundo and Wodi-Gemzu

For the purpose of this study, physical capital components were ownership of oxen, cows, shoats and donkeys. A summary of the physical capital index, represented by the combined index of livestock possession of oxen, cows, shoats and donkeys (see Appendix 13) is shown in Table 15. When the relative fragility of physical capital is compared across the three sites, clear differences emerge. Households in Das-Gundo are less fragile, with 30% of sampled households in this category, compared with 13.3% and 7.14% for Kumer and Wodi-Gemzu respectively. However, comparable levels of more fragile physical capital were found across all sites.

Differences between the sites can be attributed to uneven access to credit and to non-farm income opportunities. For instance, compared to Wodi-Gemzu, households at Das-Gundo reported that they had better access to credit. However, households in Kumer and Das-Gundo had a similar level of credit service. Therefore, the difference can be attributed to the fact that households in Kumer can focus on non-farm income earning activities than households in Das-Gundo. This is because households in Kumer, relatively speaking, have better non-farm income earning opportunities.

Table 15: Household physical capital profile by site

	Sites							
	Kumer		Wodi-Gemzu		Das-Gundo		Total	
Level of fragility	Freq.	%	Freq.	%	Freq	%	Freq.	%
Less fragile	4	13.33	2	7.14	9	30.00	15	17.00
Fragile	12	40.00	12	42.86	4	13.33	28	31.82
Highly fragile	14	46.67	14	50.00	17	56.67	45	51.14
Total	29	100.00	28	100.00	30	100.00	88	100.00

Source: Author's own survey data 2008

7.5.2 Similarities and differences between sites

Survey results showed that more than 50% of the sampled households did not have any livestock besides oxen and poultry (see Appendix 4). The higher percentage of households possessing oxen over other kinds of livestock could perhaps be explained by the fact that oxen were distributed during resettlement and are the main source of power for ploughing. The ownership of poultry was probably due to the obvious fact that it requires little investment relative to other livestock.

Oxen ownership was higher in Kumer, with one ox per household on average, compared to 0.85 and 0.84 respectivey for Das-Gundo and Wodi-Gemzu. Das-Gundo households had more shoats, with 2.55 per household on average compared to 0.44 and 0.58 in Kumer and Wodi-Gemzu. There was a slight difference with regard to ownership of donkeys, cows and poultry.

Table 16: Average livestock holding by site

	Resettlement sites			Average of the
Animals	Kumer	Das-Gundo	Wodi Gemzu	sites
Oxen	1	0.85	0.84	0.9
Cows	0.41	0.70	0.37	0.49
Sheep or Goats	0.44	2.55	0.58	1.19
Donkeys	0.41	0.30	0.47	0.39
Poultry	2.12	2.88	3.47	2.82

Source: Author's own survey data 2008

7.6 Household Access to Social capital

7.6.1 Relative fragility in Kumer, Das-Gundo and Wodi-Gemzu

In Ethiopia, social networks and family often help to cope with extreme events of famine as well as everyday risks. In addition, people in rural areas are involved in labour exchange arrangements during harvesting, such as weeding and other agricultural activities. In this study, the household fragility index incorporated membership of social grouping or cooperatives, and whether the household had relatives to ask for support as key subcomponents of social capital.

Despite the important protective role of social capital in sustaining livelihoods the index results in Appendix 15, summarised in Table 17, indicate a high level of social fragility in the livelihoods of households in Kumer and Das-Gundo. Even though the survey results showed that the households all had a similar percentage of relatives in the three sites, only the residents at Wodi Gemzu had reported the existence of *Iddir* (burial society).

Table 17: Household social capital profile by site

	Sites						Total	
	Kumer		Wodi-Gemzu		Das-Gundo			
Level of fragility	Freq.	%	Freq.	%	Freq.	%	Freq	%
Less fragile	4	13.33	0	0.00	1	3.33	5	5.68
Fragile	6	20.00	17	60.71	11	36.67	34	38.63
Highly fragile	20	66.67	12	39.28	18	60.00	49	55.68
Total	30	100.00	28	100.00	30	100.00	88	100.00

Source: Author's own survey data 2008

7.6.2 Similarities and differences between sites

Survey results indicated uniformly low levels of social support across all settlements, with the majority of respondents (57%) reporting that they had "no one to talk to". This ranged from 51.8% in Das-Gundo to 61.3% in Wodi-Gemzu.

Fragile levels of social capital were further underlined by the fact that there were no social support groups such as *Iqqub* (rotating savings) or *Mahiber* (feasts).Only 9.6% of respondents, all of whom were from Wodi-Gemzu, were members of an *Iddir* (burial society).

These low levels of social support are graphically illustrated by this account by a 45-year-old participant at Das-Gundo, who has three daughters. It illustrates how the absence of mutual assistance has affected his family's food and livelihood security.

In June 2008, I ploughed four hectares of land including two hectares of land which I rented from previous settlers to pay three quintals of sorghum after harvest. Nevertheless, I got sick (TB) during the harvesting season in August. My daughters were too young to work for the weeding and I had no money to pay for wage labour. I sold all the livestock for my medical expenses; I sold a donkey for 700 birr and seven goats for 220 birr. I had no relatives who could assist me with weeding or who could lend me the money to pay for wage labor. Besides this, due to heavy rains in August, the land was waterlogged and there was nothing my wife could do. If I had not been sick, I could have replanted teff. Consequently, I only got 30 kilograms of sorghum, 60 kilograms of sesame and five kilograms of pepper (locally called "Berberie") from four hectares of land, which was not enough even to pay the land rent. Hence, this year, I need food aid to survive. If it were in my home area (Jamma district) it would not be a problem because family members and neighbors would do all the farming activities for me.

(Source: Author's field notes, December 2008)

7.7 Household human capital

Labour is the rural poor's most important asset, as income is generated through wage employment and agricultural production or through the production of other goods and services. In this case, the education of household members, the gender of the head of household, the age of the head of household and family size are critical. For the purpose of this study, the components of human capital were: the age of the head of household, the highest education level reached in the household, the marital status of the head of the household and the number of members of the household at a working age.

Table 18 summarises the index results presented in Appendix 12 and shows a higher percentage of households with less fragile human capital at Das-Gundo than at the other two sites, especially compared to Wodi-Gemzu.

Table 18: Households human capital profile by site

	Sites							
	Kumer		Wodi-Gemzu		Das-Gundo		Total	
Level of fragility	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less fragile	10	33.33	7	25.00	12	40.00	29	32.95
Fragile	14	46.67	17	60.71	16	53.33	57	64.77
Highly fragile	6	20	4	14.29	2	6.67	12	13.64
Total	30	100.00	28	100.00	30	40.00	88	100.00

Source: Author's own survey data 2008

7.7.2 Similarities and differences between sites

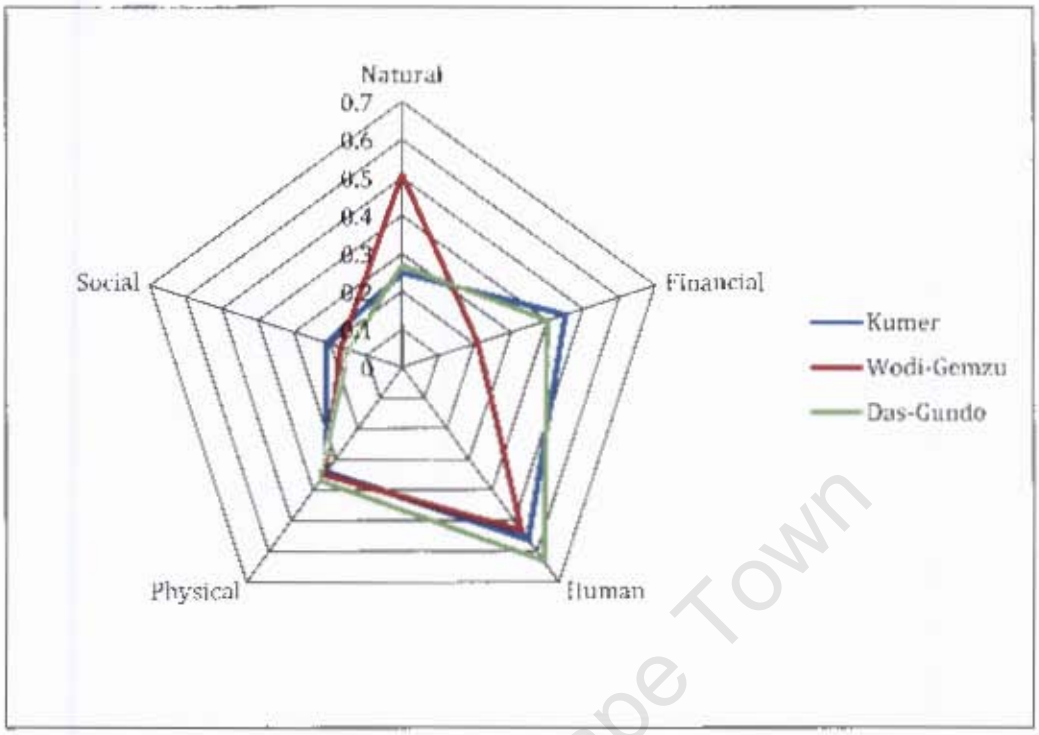
The variation is attributed to the difference in the number of working age group members in the households. On average, the residents of Wodi-Gemzu have 1.8 working age members per household, compared with 2.32 in Das-Gundo and 2.1 in Kumer. This is because, as shown in Table 8, 65% of the heads of households in Wodi-Gemzu are younger (age 20-35) compared with 32% and 23% in Das-Gundo and Kumer respectively. Moreover, the percentage of married households in Wodi-Gemzu was low (71%) compared to 84% in Das-Gundo and Kumer each (see Table 9 in Chapter 6).

7.8 Application of Household Composite Fragility Index to Kumer, Das-gundo and Wodi-gemzu

7.8.1 Results differentiated by household assets

The household livelihood fragility index that was developed in the course of this study provides a tool for consolidating information gathered on the different livelihood assets mobilised by resettling households in Metema. It sought to provide a means for profiling considerably different asset components within households, as well as for comparing the role played by the respective asset portfolios across the three sites (see Figure 12 and Table 19 below).

Figure 12: Household major asset profile by site



Source: Author's own survey data 2008

Table 19: Average indices of the livelihood capitals by site

Site	Livelihood capitals				
	Natural	Financial	Human	Physical	Social
Kumer	0.25	0.45	0.56	0.34	0.21
Wodi Gemzu	0.51	0.21	0.53	0.35	0.17
Das-Gundo	0.27	0.4	0.63	0.37	0.15

Source: Author's own survey data 2008

The composite asset pentagon represents and compares the average indices of the major asset components at each site, which range from 0 (relatively more fragile) at the centre to 0.7 (less fragile) on the outside margins.

The figure illustrates an uneven distribution in the livelihood portfolios in the three resettlement sites. Of particular note are the roles played by natural and financial capital in Wodi-Gemzu and Kumer respectively (this is explained in Section 7.3 and 7.4). In Wodi-Gemzu, household access to natural capital is markedly more robust than that in Kumer and Das-Gundo. On the other hand, the

index suggests that households in Kumer are less financially fragile than those in the other two sites. However, the composite asset pentagon indicates convergence in the social, physical and human capital across all sites, with social capital in particular generating the lowest value of all the asset components.

Table 16 underlines this, with 100% and 96.67% percent of households at Wodi-Gemzu and Das-Gundo shown to be either fragile or highly fragile in terms of social capital. Similarly, households residing in Wodi-Gemzu were found to be highly fragile with respect to financial capital, generating an index value of only 0.21.

The overall composite index, however, showed marginal differences across the three sites: 0.54 for Wodi-Gemzu, 0.49 for Das Gundo and 0.48 for Kumer.

7.8.2 Composite results differentiated by ranked level of fragility

The index results presented above are corroborated by Table 20, which compares and differentiates households across all three sites by their composite levels of fragility. The index shows that 25% of households in Wodi-Gemzu have less fragile livelihoods compared with 16.67% and 13.3% of households in Kumer and Das-Gundo. Yet, larger percentages of Wodi-Gemzu households (25%) are also ranked as highly fragile compared to those in Das-Gundo and Kumer. These anomalies are attributed to the significant contribution to livelihood made by natural capital in Wodi-Gemzu, combined with a markedly reduced contribution of social and financial capital compared to the other sites.

Table 20: Households overall livelihood fragility by site

Level of livelihood fragility	Resettlement sites						Total	
	Kumer		Wodi-Gemzu		Das-Gundo			
	No.	%	No.	%	No.	%	No.	%
Less fragile	5	16.67	7	25	4	13.3	16	18.18
Fragile	18	60	14	50	21	70	53	60.23
Highly fragile	7	23.33	7	25	5	16.67	19	21.59
Total	30	100	28	100	30	100	88	100

Source: Author's own survey data 2008

7.9 Household Asset Profile and Food Security Status

Table 21 depicts the relationship between the households' asset profiles and food security status. It shows a weak relationship between household fragility levels and food security status; 40% and 25% of households residing in Kumer and Das Gundo respectively faced food insecurity problems, even though their livelihoods were shown to be less fragile. However, all of the households with a less fragile livelihood profile in Wodi-Gemzu were food secure. This shows the significant role that household access to natural capital plays in the livelihood of the resettled households. It is more important than the other capital components as it was found to be more robust in Wodi-Gemzu than the other sites. In addition, weak relationship between a composite household livelihood fragility and food security also indicates the unsustainable characteristics of the livelihoods of households, which are highly vulnerable to the impacts of waterlogging, striga weed infestation and other shocks and stresses identified in the sites. Thus, the potential for households to temporarily food insecure is high if any of these shocks occurs.

Table 21: Food security status of households by livelihood fragility level

Level of livelihood fragility	Food security status					
	Food insecure		Food secure		Total	
	No.	%	No.	%	No.	%
Kumer						
Less fragile	2	40.0	3	60.0	5	100
Fragile	8	44.4	10	55.6	18	100
Highly fragile	2	28.6	5	71.4	7	100
Wodi-Gemzu						
Less fragile	0	0	7	100	7	100
Fragile	1	7.1	13	92.9	14	100
Highly fragile	1	14.3	6	85.7	7	100
Das-Gundo						
Less fragile	1	25	3	75	4	100
Fragile	4	19.0	17	81.0	21	100
Highly fragile	1	16.7	4	16.7	5	100
Total						
Less fragile	3	18.8	13	81.3	16	100
Fragile	13	24.5	40	75.5	53	100
Highly fragile	4	21.1	15	78.9	19	100

Source: Author's own survey data 2008

7.10 Gender and Livelihood Fragility

Table 22 represents the association between the gender of the head of household and livelihood fragility. The result indicates that a higher percentage of female-headed households (66.7%) had highly fragile livelihood profiles compared to only 14.5 % of male-headed households. This is because, as mentioned in Chapter Six, the majority of the female heads of households interviewed (92%) were single, compared to only 10% for the male heads of households, and this limited their working age group members. Furthermore, the environment is extremely harsh for women to undertake agricultural activities or to be engaged in wage labor activities to earn additional income. In addition, support from relatives was reported to be minimal in the resettlement sites, especially when it came to farming activities for female-headed households. Thus, the female-headed households could not plough even the two hectares of land they were given in the resettlement sites. Consistent with this, the survey results revealed that the average size of the land ploughed in the 2008 harvest season by female-headed households was 1.66 hectares, whereas the male-headed households ploughed 2.54 hectares of land on average. All these conditions negatively affected income from agriculture. Consistent with this, the survey results indicate an average annual income of 9177.63 birr for male-headed households compared to only 4116.58 birr for female-headed households.

Besides this, labor wage will mostly result from farming activities, for which males are preferred over females. As a result, the average annual non-farm income for male-headed households (873 birr) was almost three times that of female-headed households (304 birr).

Table 22: Livelihood fragility level by gender

Household food security status	Livelihood fragility level						Total	
	Less fragile		Fragile		More fragile			
	No.	%	No.	%	No.	%	No.	%
Male	15	19.7	50	65.8	11	14.5	76	100
Female	1	8.3	3	25	8	66.7	12	100

Source: Author's own survey data 2008

7.11 Chapter Summary

This chapter compared household asset profiles in the resettlement sites through the application of the livelihoods fragility index developed in the come of this study. Results profiled the uneven contribution of the different household livelihood components across the sites, with households in Kumer being financially less fragile while those in Das-Gundo and Wodi-Gemzu were found to be less fragile with respect to physical and natural asset. Similar index values were derived in terms of human and social assets across the three sites, with index values for social capital extremely low. Results suggest that with an overall composite index of 0.54, households who reside in Wodi-Gemzu have a slightly but not significantly more robust asset profile than those in Das-Gundo and Kumer. Results also indicate a weak association between household livelihood fragility level and food security status. However, strong associations were found between household livelihood fragility levels and the gender of the head of household. This particularly highlights the difficulty faced by female headed households in the resettlement sites with respect to crop production and its consequence for income.

CHAPTER EIGHT
DISCUSSION AND FUTURE DIRECTIONS

8.1 Introduction

This final chapter discusses the study findings in relation to prevailing literature on resettlement, disaster risk, livelihood and food security theories. It then presents recommendations for policies related to resettlement and proposes areas of further research.

8.2 Research Findings Revisited

8.2.1 Focus of research

This study sought to identify the main external shocks and stresses that faced the resettled families in Metema. It also sought to examine and compare the livelihood profiles of the resettled families across the three sites with respect to their relative livelihood fragility and robustness in the different areas. It also aimed to investigate the degree to which institutional and structural factors enabled or discouraged successful adaptation to the new sites.

8.2.2 Key livelihood, health and environmental threats

The research findings indicated a complex vulnerability context characterised by a diverse combination of naturally occurring threats, including waterlogging, striga weed infestation and malaria. In addition to naturally occurring threats, it was found that the households were also exposed to export-related price volatility due to their dependence on cash cropping, as their commercial crops (predominantly sesame) are produced mainly for the export market. A case in point was a decline in the price of sesame from around 2400 birr in the previous year to 900 birr per quintal in December 2008 in Metema. Coupled with this was an increase in the price of the consumer goods that the households purchase with the proceeds of their commercial crops.

Focus group and key informant interviews also profiled malaria as the recurrent and major health problem, followed by water-borne diseases such as diarrhoea. Respiratory tract infections

(pneumonia and bronchitis), intestinal parasites and TB were also identified as health concerns. The problems were reported across all three resettlement sites.

Waterlogging and invasion by striga weeds (locally called "Akenchira") were found to be the two pervasive natural threats to agricultural production in all of the resettlement sites. All the sampled households reported waterlogging as the largest problem. Noxious weed infestation by striga was also reported as a major problem by 83% of the sampled households. Moreover, there is a decline in productivity due to the shallowness of the soil (which is ideally favourable for shifting cultivation).

8.2.3 Livelihood configuration and differentiation across the three Sites

Livelihood opportunities provided by new environmental conditions

The research findings underlined the critical importance of environmental conditions–not only as a potential threat (i.e. waterlogging) but also as a key livelihood opportunity. The results showed unexpected differences in the perceived quality of life across the three sites. This especially applied in the case of Wodi-Gemzu compared to Das-Gundo and Kumer.

The findings indicated that compared to their district of origin, the sampled households viewed Metema as a better and more productive location. Firstly, larger landholding sizes combined with better access to rental land were reported. While 48.3% of the sampled households reported that they had been landless in their original areas, each resettling household had received two hectares of farmland plus 500 square meters for a house and garden. This was approximately three times more than the average landholding size of those who had land in their home areas (0.676 hectares).

Secondly, better off-farm labour wages were reported, as the district is a commercial crop growing area. Thirdly, the availability of abundant grazing land and a better market for livestock in neighbouring Sudan offered a great opportunity for livestock growing as a major source of livelihood. Fourth, there is higher potential for incense and gum production and it was estimated that this could be a significant source of income for the resettled (estimated at 43.6% of household's annual income in the district's plan).

Predominant livelihood strategy across all three sites

Unsurprisingly, livelihood sources and strategies were poorly diversified across the three sites, and largely limited to crop production, livestock and off-farm/non-farm income. Crop production was the single largest source of income for the majority, accounting for 83.4% of household's annual income on average. In addition, study findings indicated that for 80.8% of the sampled households, the agricultural activities of crop production and animal husbandry were the only sources of income.

Compared to the home areas, greater opportunities for generating off-farm labour wages were also reported–mainly because the district is a commercial crop producing area. However, off-farm/non-farm incomes reportedly contributed only modestly to household livelihoods across the three sites, generating 9.37% of total household income on average. These activities comprised of income from wage labour, charcoal and wood selling, local alcohol selling, blacksmithing, video shows and looking after other households' cattle.

Contrary to expectation, none of the sampled respondents reported income generation from gum and incense collection. Instead, households reported that they have been clearing trees for the expansion of farmland. It was also found that an effort was being made to increase numbers of livestock, as this important source of income was very limited.

Livelihoods compared: The experience of Kumer, Das-Gundo and Wodi-Gemzu

Survey findings prior to the application of the livelihood fragility index indicated a more favorable resettlement outcome for families in Wod-Gemzu as compared to the other sites. They also showed that households at Wodi-Gemzu reportedly generated an annual income of more than twice that of the other two sites (13,784 birr compared to 6,425 and 5,362 birr in Das-Gundo and Kumer respectively). In addition, the majority of households in Wodi-Gemzu perceived their life to be better after resettlement and viewed themselves as food secure than households in Das-Gundo and Kumer. This was primarily attributed to significantly stronger crop production in Wodi-Gemzu, which generated two to three times more household income compared with crop output at Das-Gundo and Kumer. This productivity was attributed to the fact that Wodi-Gemzu was reportedly a more recently resettled area, with relatively less exploited and degraded land.

Application of the livelihood fragility index, however, highlighted important differences in the composite livelihood profiles of the households living in the three sites. Overall composite index values that consolidated the livelihood portfolios of the households suggested that households in

Wodi-Gemzu have a slightly more robust livelihood profile than those in Das-Gundo and Kumer, as evidenced by respective index values of 0.54 in Wodi-Gemzu, 0.49 in Das-Gundo and 0.48 in Kumer.

Despite this, households in Wodi-Gemzu were found to be highly fragile with respect to financial and human capital compared to Kumer and Das-Gundo, and with respect also to physical capital, compared to Das-Gundo. As stated earlier, this was attributed to Wodi-Gemzu's location being far from the district capital, which constrained access to credit services and non-farm income opportunities. More or less the same profile was indicated with respect to social and human capital; social capital was fragile in all three sites.

While differences prevailed across all the sites, both the survey findings and the livelihood fragility index underlined the contribution that crop production plays as the main livelihood source in the three sites. This also highlights the more significant contribution of natural capital–particularly the quality/fertility of land cultivated for household livelihoods, compared to other productive assets.

8.2.4 Key institutional and structural determinants that mediate household livelihood fragility

The research findings highlighted major shortcomings in the institutional and structural support provided for all of the sites. This was reflected in composite rank values 18, 28 and 32 that assessed the relative adequacy of essential services respectively in Wodi-Gemzu, Das-Gundo and Kumer.

Despite the households' heavy dependency on crop production, agriculture extension services were weak to non-existent. This had wide-ranging implications for cultivating appropriate crops (i.e rice) rather than teff under waterlogging conditions. It also limited the adoption of modern agricultural technologies to manage environmental threats such as waterlogging.

Constrained access to credit services similarly limited livelihood diversification. This was in part due to the absence of credit providers. It was also limited by unrealistic micro-lending eligibility for the resettled households, which required them to establish "saving groups" among trusted friends and neighbors. Such expectations proved to be unrealistic in the resettlement sites, as they were characterized by low levels of social capital.

In addition, the combination of weak market integration, poor transportation services and low institutional support exposed the households to high price fluctuations. It is also observed that

health problems in the resettlement sites were exacerbated by the absence of adequate health services and poor access to water sources for domestic consumption.

8.3 Discussion of Study Findings in Relation to Prevailing Literature

8.3.1 Overview

This research was informed by four areas of literature, including contemporary approaches to the study of resettlement, as well as the disaster risk domain, livelihood approaches and literature relating to food insecurity. The results are directly relevant to each of these domains and not only provide empirical findings but also insights on the value of applying integrated research methods in risk-prone contexts.

8.3.2 Interpreting findings in relation to prevailing literature on resettlement

The complexity of the issues around resettlement for the families concerned has been underlined through De Wet's extensive research. This perspective highlights the interrelatedness of a range of determinants at different levels, such as cultural, social, environmental, economic, institutional and political factors. These make resettlement a complex process and undermine the realization of the intended goals of resettlement projects (De Wet 2009). In this context, the study results also highlighted the influence of numerous and complex factors in the livelihood adaptation of households in the resettlement sites. These include natural shocks and stresses, unpredictable price trends, weak social capital, poor access to credit and other essential services as well as the characteristics of the household itself (i.e age of head of the household, gender of the head of the household).

Similarly, consistent with both the inherent complexity and IRR approaches, the livelihood fragility index results also showed that social capital is highly destabilized due to resettlement. In the three sites, constrained social capital was shown to limit households from accessing credit from ACSI and in accessing incense and gum harvesting as a viable livelihood strategy. In addition, and consistent with Cernea's IRR approach, the findings also indicated that poor livelihood diversification and the low prices realized for their produce, as well as exposure to natural shocks and stress (waterlogging,

striga weed infestation and malaria) in the resettlement sites were partly due to poor institutional support across a wide range of essential services and sectors.

However, one possibly anomalous finding that illustrates the complexity of resettlement research was the more positive wellbeing perception and higher income for households residing in Wodi-Gemzu compared to those in Das-Gundo and Kumer. This was despite the area's relatively poor access to essential services, including credit and transport. This was due to the dominance of a natural resource-based livelihood that was overwhelmingly dependent on crop production. Given this dependence on natural capital, those residing in Wodi-Gemzu were found to be more robust compared to the other sites.

However, with their poor livelihood diversification and recurrent exposure to natural shocks and stresses, as well as volatile market trends, the robustness of the livelihoods of households in Wodi-Gemzu is misleading and short term. It also illustrates the complexity of resettlement-related research, where in this case the apparent robustness of crop production is time-bound and short term. This is because with the increase in population and the declining fertility of the soil, crop production alone will not provide sufficient and sustainable livelihood opportunities in the long run. Thus, in the long run the protective capacity of the natural capital will itself become endangered and create a repeat of the situation in the resettled households' original areas. This also underlines the need for government and other stakeholder support to build diversified livelihood sources in fertile resettlement areas like Wodi-Gemzu without undermining the natural base of the sites.

8.3.3 Findings in relation to resettlement studies in Ethiopia

The study findings also address gaps in prevailing resettlement literature in Ethiopia. For instance, most of the past studies on government-sponsored resettlement in Ethiopia focused more on either the process of resettlement (voluntary or forced) or the socio-cultural implications of resettlement (Ezra 2001a and b). However, there is little documented attention given to the role of external threats (natural shocks and stresses) in undermining or enhancing household livelihood. Research findings from this study underline the value of this domain, particularly as it is also becoming an increasing concern in the international arena, due to the significant influence of climate change in the livelihoods of the poor.

8.3.4 Interpretation findings in relation to disaster risk literature

As stated in Section 2.2.3, vulnerability is one of the key concepts in understanding disaster risk. While there are many different definitions as well as interpretations and usages, the Pressure and Release (PAR) model and Pelling's human vulnerability framework have largely informed this research (Pelling 2003 and Wisner et al.; 2004).

The results of this study converge significantly with the conceptualization and application of the PAR model. This approach views disaster risk as a function of two opposing forces; processes generating vulnerability on one side, and the natural hazard event on the other. It further differentiates the processes that generate vulnerability into three causal levels, which are termed as the progression of vulnerability. These are: *the root causes*, *dynamic pressure* and *unsafe conditions* (see Section 2.2.3). The model further emphasizes that mitigating or minimizing disaster risk is possible by addressing root causes, which are usually remote from the occurrence of the disaster event.

In this context, the study results suggested that even if the government's objective of food security has been temporarily achieved, the progression of vulnerability has in fact not been halted and over time will eventually progress to permanent (chronic) food insecurity. This is for various reasons.

Firstly, the root causes of recurrent food insecurity, which require long-term development programmes, have not been given enough attention. Secondly, the research results showed numerous socio-economic, environmental and institutional processes (dynamic pressures) that are already transforming these root causes into unsafe conditions. These include poor social relations, the absence of local social institutions, high price volatility, increasing deforestation due to the expansion of cultivated land, an absence of a social safety net programme, poor access to essential services, a lack of access to credit, poor agricultural extension services and less involvement by NGOs.

Field research indicated increasing evidence of unsafe conditions. These included water logged land, declining soil productivity, unpredictable rainfall patterns, a harsh environment, and the presence of female and elderly headed households.

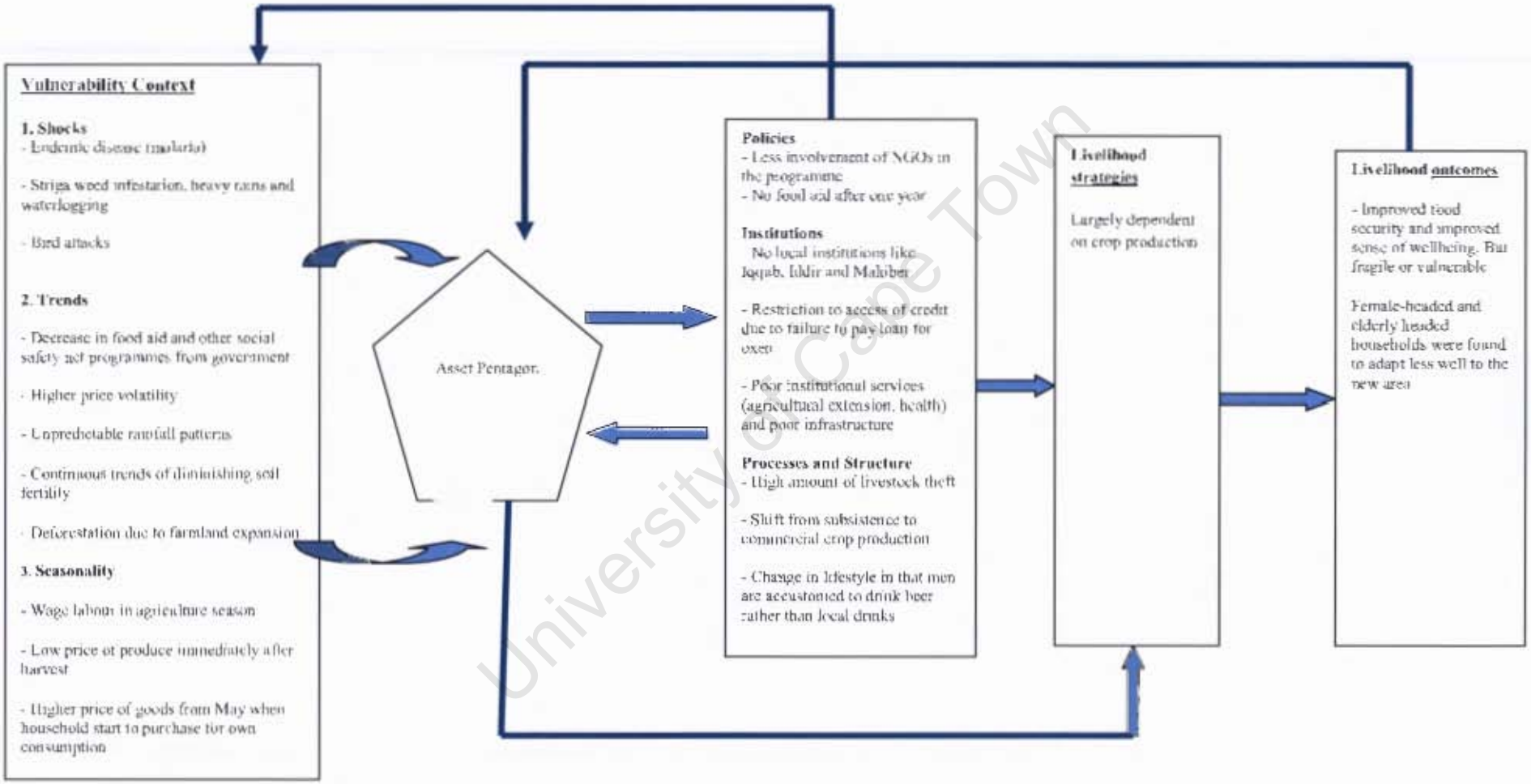
In this context, the study findings are highly consistent with disaster risk literature; as they profile the ways in which household and settlement vulnerability contribute to accumulating disaster risk in poor communities.

8.3.5 Interpretation of Study Findings in Relation to Livelihood and Food Security Literature

8.3.5.1 Study findings in relation to livelihood literature

The application of the livelihoods framework in this study provided an invaluable integrating model for differentiating the various components of risk and vulnerability among the resettled households. For instance, as shown in figure 13, the livelihoods framework provided the researcher with an integrated frame for investigating the complexity of life in the three-resettlement sites. The study findings were consolidated across the major components of the framework. In addition, the sustainable livelihood framework provided a systematic frame for developing and applying the livelihoods fragility index. This provided a method for differentiating levels of household livelihood fragility across the three sites.

Figure 13: Application of the sustainable livelihood framework



Source: Adapted from DFID 1999

8.3.5.2 Study findings in relation to food security literature

As described in the literature review, transitory food insecurity is associated with short term shocks, while chronic food insecurity is the result of a failure to address the underlying causes which require long-term development interventions. These include extended periods of poverty, a lack of assets, inadequate access to productive or financial resources and an inappropriate socio-economic environment. In this context, the prevailing literature stresses the links between the robustness of household livelihoods and household food security (Maxwell et al., 2008).

Study results indicated that the households in the resettlement sites are vulnerable to both transitory and chronic food insecurity. This was confirmed by 24% of households reporting transitory food insecurity on average for three months a year due to the natural shocks of waterlogging and striga weed infestation.

However, the study findings indicated that the underlying/root causes of chronic food insecurity that motivated the resettlement programme in the first place were poorly addressed in Metema. For instance, the root causes of food insecurity in the highlands were land degradation, poverty, declining land holding size or landlessness, poor livelihood diversification and poor agricultural practices (Haile 2004; Belay 2004). Regrettably, the findings of this study indicated a comparable scenario in the resettlement sites, which is likely to result in the long-term erosion of the natural asset base and a permanent decline in household food security ('chronic food insecurity') over time. The findings indicated that crop production is the main source of livelihood across the resettlement sites. It also indicated differences in livelihood profiles across the three areas, highlighting how households with relatively robust (less fragile) natural capital at Wodi-Gemzu had achieved better livelihood outcomes than the other sites, at least in the short-term. In addition, as stated earlier, across all of the sites there was compromised access to social capital, poor financial and institutional support, poor livelihood diversification and poor provision of essential services.

Such findings underline the significant shortcomings in government attempts to address the underlying and longer-term causes of food insecurity through resettlement to areas considered more environmentally robust. Evidence from this research suggests that the resettlement programme has focused mainly on addressing transitory food insecurity rather than on reducing its long-term determinants. This is because the provision of land for cultivation constitutes a limited and short-term solution without appropriate development interventions that protect the livelihood portfolios of the resettled households.

8.4 Study Insights Gained through the Application of the Livelihood Fragility Index

This study has developed a composite livelihood fragility index, which uses 14 household level variables that are sub-categorized under the five major household asset categories of the sustainable livelihood framework. However, the livelihood fragility index diverges somewhat from conventional studies of disaster vulnerability. Unlike disaster vulnerability analysis, which usually examines the relationships between indicator variables in relation to a specific hazard, the livelihood fragility index developed here sought to be more holistic and multi-dimensional. It captures the complex interactions between different household indicator variables that ultimately determine the degree of household livelihood fragility in relation to wide-ranging natural and other shocks and stresses.

The livelihood fragility indexes specifically enable the researcher to investigate and compare differences in the livelihood profiles of households across the sites, while also providing quantitative values for the comparison of livelihood profiles across the sites. This provided analytic insights on the complex relationships between variables (for instance, livelihood fragility level by gender, food security status of households by level of livelihood fragility). In addition, the index values were important for examining the fragility level of the different asset categories within the specific sites. For instance, this study showed that social capital was more fragile compared to the other asset categories across the three sites.

In this context, the index offers valuable insights for resettlement policy and for priority settings, as it allows for the differentiation of household capability across sites, over time and at risk groups.

8.5 Future Directions

8.5.1 Introduction

This study highlights the numerous issues that are related to both to the effectiveness of the resettlement programme in Ethiopia and to research in this domain. This section addresses both of these areas. Resettlement is part of the Ethiopian government's efforts to improve the food security of vulnerable households. However, this research indicates that for a resettlement programme to be effective and address its objectives in a sustainable way, without humanitarian and ecological consequences, it needs to take into account and address different socio-economic, ecological and

demographic issues. The following section suggests responses that would strengthen the robustness of current resettlement strategies for policy developers and implementing bodies and also suggests further research based on the study results.

8.5.2 Implications for resettlement policy and practice

Identification of more robust candidate households

While the resettlement programme was open to all groups of households (elderly headed, female headed, etc.), the results suggest that the coping and adaptation capabilities of the different groups of households were different. For instance, the results showed that male-headed households have more robust livelihood portfolios than female-headed households. Similarly, the average income for younger headed households was twice that of the older-headed households. Hence, a certain precondition or criteria should be considered in identifying households that are likely to adopt more favourably. Female-headed and elderly-headed households could be involved in alternative development programmes in their home areas, such as food for work or cash for work safety net programmes which would build their asset base.

Appropriate social protection through transition

The programme seems to be very ambitious in that it demands that households are self sufficient within the first year of resettlement and yet offers only meagre institutional support. The research findings indicated that there were some households who were food insecure even after four years in the area. Therefore, consideration should be given to extending the time frame for food aid and other support beyond one year, in order to allow households to accumulate assets and to be able to withstand shocks.

While results indicated that livestock theft is a problem in the resettlement sites, grazing land was found to be abundant. In this context, government attention to minimize the risk of livestock theft would allow households to diversify into increasing livestock production as a supplementary or major source of livelihood.

Results also underlined the need for greater preparatory work prior to the implementation of the resettlement programmes. In this context, risks need to be identified and mitigation plans made for the environmental and livelihood risk exposures that have been identified in the resettlement areas before implementation.

Strengthened Service provision

In this study, government services were observed to be inadequate, especially health services (despite the relatively high health risks of malaria in the area). Therefore, additional investment is required in the provision of these essential services. Specifically, the upgrading of health posts and the provision of all-weather roads would contribute substantially towards reducing the risk of death from malaria and the improved market integration of the sites.

In addition, upgrading the schools (to at least grade eight) would ease difficulties for children in walking long distances to other neighbouring sites, in the harsh environment. The very poorly functioning hand pumps and motorized pumps for domestic consumption in the sites also illustrate an urgent need for the Water Resource and Development Bureau and other concerned bodies to both maintain the pumps and train individuals from the sites on how to repair them, in order to ensure their sustainability.

A critical priority is the strengthening of agricultural extension in the resettlement areas. For instance, one of the main problems in crop production was waterlogged land; this could reportedly be solved by using Broad Bed Maker (BBM) farming tools for ploughing, or by growing rice in land where waterlogging is a problem. However, the study results indicated that the resettled farmers were not applying the appropriate solutions due to lack of knowledge and the fact that they were unfamiliar with what practices could be undertaken. Therefore, close supervision and training by extension workers is necessary for the new settlers, so they become familiarised with the new agro-ecology and the appropriate crops to cultivate in the resettlement sites.

Strengthening livelihood diversification

Ellis (2003) has noted, 'for rural dwellers, risk reduction can only occur by spreading risk across assets and activities that have different types of risks associated with them.' Hence, to ensure livelihood sustainability there should be a shift in livelihood sources from being largely dependent on crop production to a diversified means of income such as small trading, livestock production, bee keeping and wage labour. The area has the potential for all these activities.

This underlines the need for long term and adequate support in access to credit to build up the asset bases of households; and in providing training on basic or important livelihood sources that are available in the area.

Building Social Capital

Low social capital was observed as a pervasive and important constraint in accessing credit and in diversifying livelihood with regards to incense harvesting. Hence, facilitative support is needed to establish and strengthen social institutions like *Iqqub*, farmers' associations, *Mahiber* and *Iddir,* in order to build social capital, as these will serve as intermediary market actors to help diversify livelihood and cope with crop failure.

Social capital could also be enhanced through the establishment of farmers' cooperatives. These enable farmers to sell their products at reasonable prices after harvest.

8.5.3 Directions for further research

This study underlines the need for future research that examines the contribution of seasonality to the experience of resettlement. One specific priority for further study would be a closer investigation of livelihood fragility in relation to seasonal exposure and over time. This might be undertaken through comparative case studies during different seasons, with a larger sample size, and would allow a more in-depth investigation into the change in livelihoods over time and the resettled households associated wellbeing.

Given that the soil is shallow and shifting cultivation was the practice in the area, reportedly productivity of the land is declining from the first year of resettlement as the two hectares of land was not enough to do the same. Hence, extensive research is important to study the conditions of the soil and apply appropriate technology or to revise the amount of land to be redistributed for resettling households

In addition, with regards to the livelihoods fragility index that was developed in the course of this study, future research might apply and test the relevance and robustness of the index in other contexts.

8.6 Conclusion

The results of this study suggest that for environmentally induced voluntarily resettled households, a resettlement programme potentially offers positive benefits to household food security.

For instance, in this study, the households reported that land was scarce and severely degraded in their home areas. In addition, the original areas reportedly offered limited alternative means of livelihood. Drought was also a recurrent problem.

Conversely, the Metema resettlement area offers abundant grazing land and large plots of fertile agricultural land. In addition, incense and gum trees offer alternative sources of income, and wage labour is a relatively better income source. In this context, resettlement to Metema has eliminated at least the main problem of landlessness and diminishing landholdings that prevailed prior to resettlement and that significantly constrained food security. This had resulted in a significant proportion of households in highland areas being caught in food insecurity 'traps', with some dependent on food aid for many decades.

However, the results of this study challenge government expectations that food security can be ensured through the provision of large land holdings and meagre government support in the provision of essential services. As stated earlier, the study indicated complexities in the livelihood adaptation of households due to the interplay of natural hazards, institutional constraints and due to the characteristics of the households. Therefore, for a resettlement programme to be effective it should incorporate and address the issues profiled in the recommendation above.

REFERENCES

Achan-Okiria, P. (2007). *The Internal Displacement Crisis in Africa: Implementation of National and International law on the child marriage phenomenon in Uganda.* A dissertation submitted to the faculty of law of the University of Pretoria, in partial fulfilment of the requirements for the degree of masters of law (LLM in human rights and democratization in Africa. [Online] Available: http://www.up.ac.za/dspace/bitstream/2263/5276/1/achan.pdf [05 June 2009]

Abutte, W. (2000). *Social re-articulation after resettlement: Observing the Beles valley scheme in Ethiopia.* In Cernea, M and McDowell (2000). Risks and reconstruction: Experiences of resetlers and refugees. The international Bank for reconstruction and development, The World Bank, Washington, USA

Adenew, B. (2006). *Effective Aid for Small Farmers in Sub-Saharan Africa: Southern Civil Society Perspectives, Ethiopia.* Case Study for the Canadian Food Security Policy Group

Adger, W. (2006). *Vulnerability.* Global Environmental Change, Vol. 16, pp., 268–281, Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, UK. [Online] Available: www.sciencedirect.com [30 June 2008]

ADPC (2004). *Community Based Disaster Risk Management Field Practitioners Hand Book, Tahiland.*

Ali, S. (2007). *Land Policy and Tenure Insecurity in Habru District, North-eastern Ethiopia.* A thesis Submitted for partial fulfilment of Master of Science (MSC) degree in Development and Resource Economics, Norwegian University of Life Sciences, Ås, Norway

Amhara Development Association (2003). *The Amhara Region & its People.* [Online] Available: http://www.telecom.net.et/~ada/amhara.htm [25 June 2008]

Amhara Regional State Resettlement and Rehabilitation Implementation Manual Amharic Version (October 2008). Prepared by Amhara regional state Food Security Coordination and Disaster Prevention Office.

Andersson, J., Nordwall, J. and Salomonsson, D. (2004). The link between ownership structure and firm performance: Evidence from Sweden's listed companies. Industrial and Financial Economics Master Thesis No. 37, Graduate Business School, School of Economics and Commercial Law, Göteborg University

Austrian Development Cooperation (ND). *Ethiopia Subprogram Food Security 2004-2006*: Support of Agriculture and Rural Development with Emphasis on Natural Resources Management. Federal Ministry for Foreign Affairs Minoritenplatz 9, 1014 Wien

Ayenew, Y.; Wurziger, M.; Tegegne, A. and Zollitsch, W. (2007). *Urban and peri- urban farming systems and utilization of the natural resources in the North Ethiopian Highlands*. Conference on International Agricultural Research for Development, University of Kassel-Witzenhausen and University of Göttingen, Tropentag. [Online] available: www.tropentag.de/2007/abstracts/full/176.pdf *[05 June 2009]*

Bankoff, G. Frerks and Hilhorst, D. (2004). *Mapping Vulnerability: Disasters, Development and People*. Earthscan, London.

Barnett, J. And Webber, M. (2009). *Accommodating migration to promote adaptation to climate change*. A policy brief prepared for the Secretariat of the Swedish commission on climate change and development and the world bank world development report 2010 team.

Bartolome, L., de Wet, C.; Mander, H. and Nagaraj. V. (2000). *Displacement, Resettlement, Rehabilitation, Reparation and Development.* World Commission on Dams thematic review, Social issues I.3, final version.

Belay, K. (2004). *Resettlement of peasants in Ethiopia*. Journal of rural development, vol.27, pp, 223-253. [Online] Available: http://agre.krei.re.kr/file/pdfsource/242427p.pdf [19 May 2008]

Benjamin, A. (2008). *Analysing Urban Flood Risk in Low-Cost Settlements of George, Western Cape, South Africa: Investigating physical and social dimensions*. Research Report Commissioned by National Disaster Management Centre. Disaster Mitigation for Sustainable Livelihoods Programme, University of Cape Town

Berhe, K. (2006). *Environmental Assessment and Screening Report.* Improving Productivity and Market Success of Ethiopian Farmers Pilot Learning Wereda: Metema. IPMS Environmental screening Report

Black, R.; Harrison, E.; Admassie, Y.; Pankhurst, A.; Yibabie, T.;Watson, E.; Schafer, J.; Matakala, P.; Serra, A.; and Ribeiro, A.(ND). *Migration, Resettlement and Return. Briefing Institutions for natural resource management.* University of Sussex (Brighton)

Blaikie, P., Cannon, T., Davies, I. and Wisner, B. (1994). *At Risk: Natural Hazards, People's Vulnerability and Disasters*. Routledge: New York

Brooks, N. (2003). *Vulnerability, risk and adaptation: A conceptual framework.* Tyndall Centre Working Paper No. 38, Tyndall Centre for Climate Change Research and Centre for Social and Economic Research on the Global Environment (CSERGE), School of Environmental Sciences, University of East Anglia. [Online] Available: http://earthscape.org/r1/ES15579/wp38.pdf. [30 June 2008]

Burns, N., & Grove, S.K. (1987). *The practice of research, conduct, critique, and utilization.* Philadelphia: Saunders.

Census (2007). *Summary and statistical report of the 2007 population and Housing census.* FDRE-population census commission, Addis Ababa, Ethiopia

Cernea, M. and Guggenheim, S. (1993). *Anthropological Approaches to Resettlement: Policy, Practice and Theory.* Westview press, USA and United Kingdom

Cernea, M. (ND). *Impoverishment Risks, Risk management, and Reconstruction: A model of Population Displacement and Resettlement.* A Paper Presented to the UN Symposium on Hydropower and Sustainable Development, October 27-29, Beijing, China.

Cernea, M. (2000). *Risks, Safeguards and reconstruction: A model for population displacement and resettlement*. In Cernea, M and McDowell (2000). Risks and reconstruction: Experiences of resetlers and refugees. The international Bank for reconstruction and development, The World Bank, Washington, USA

Cernea, M. And McDowell, C. (2000). *Reconstructing resettlers' and refugees' livelihoods*. In Cernea, M and McDowell (2000). Risks and reconstruction: Experiences of resetlers and refugees. The international Bank for reconstruction and development, The World Bank, Washington, USA

Chambers, R. and Conway, G. (1992). *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. IDS Discussion Paper No. 296. Brighton, UK: IDS (Institute for Development Studies), University of Sussex

Charnley, S. (1997). *Environmentally-displaced peoples and the cascade effect: lessons from Tanzania. Human Ecology, Vol.* 25, No. 4, pp. 593-618.

Cornelißen, T. and Sonderhof, K. (2008). *Marginal effects in the probit model with a triple dummy variable interaction term.* Leibniz Universit¨at Hannover, Discussion Paper No. 386

Couldrey, M. and Herson, M. (2008). *Climate Change and Displacement*. Forced migration Review, issue 3, refugees studies center, Oxford Department of International Development, University of Oxford, Oxford, UK

Davies, S. (1996). *Adaptable Livelihoods: Coping with food Insecurity in the Malian Sahel.* Macimillan Press LTD, London and St. Martin's Press Inc., New York

de Haan, A. (2000). Migrants, Livelihoods, and Rights: The Relevance of Migration in Development Policies. Social Development Working Paper No.4, Social Development Department

Dejene, A. (2003). *Integrated Natural Resources Management to Enhance Food Security: The Case for Community-Based Approaches in Ethiopia*. Environment and Natural Resources Working Paper No. 16, Environment and Natural Resources Service Research, Extension and Training Division, FAO Sustainable Development Department. [Online] Available: http://www.fao.org/docrep/005/Y4818E/y4818e07.htm [06 June 2008]

de Satgè, R., Holloway, A., Mullins, D., Nchabaleng, L., Ward, P. 2002. *Learning about Livelihoods: Insights from southern Africa*. Periperi/Oxfam: Cape Town/Oxford

De Wet, C. (2009). *Why do things often go wrong in resettlement projects*? In Pankhurst, A. and Piguet, F. (2009). Moving people in Ethiopia: Development, Displacement and the state. East Africa series, Suffolk, UK and New York, USA: James Currey

Deshingkar, P. and Grimm, S. (2004).*Voluntary Internal Migration an update*. Paper commissioned jointly by the Urban and Rural Change Team and the Migration Team within the Policy Division of the British government's Department for International Development. Overseas Development Institute, London.

Dessalegn, B. (ND). FMO Country Guide: Ethiopia. [Online] Available: www.forcedmigration.org/guides/fmo033/fmo033.pdf [19 May 2008]

Desta, S.; Kozar, R.; Kuney, S.; Malin, D.; Sadamoto, N.; Tagawa, K.; and Triplett, N. (2004). *A Critical Look at Voluntary Resettlement in the Tanzanian Context.* Workshop for Applied International Development School of international and Public Affairs, Columbia University. Online] Available: http://home.nyc.rr.com/cliffhahn/sipa_tanzania.pdf [19 May 2008]

Devereux, S. (2000). *Food Insecurity in Ethiopia*. A discussion paper for DFID. IDS Sussex. [Online]Available: http://cram-forum.jrc.it/Shared%20Documents/Food%20Insecurity%20in%20Ethiopia.pdf [20 May 2008]

DFID (1999, 2000, 2001) Sustainable Livelihoods Guidance Sheets, Numbers 1–8, London: Department for International Development. [Online] available: www.livelihoods.org [6 June 2009]

DFID (2004). *Rural and Urban Development Case Study – Ethiopia*. Oxford policy management.

Downing. T. (2002). *Avoiding New Poverty: Mining-Induced Displacement and Resettlement*. Institute for Environment and Development (IIED) and Business Council for Sustainable Development (WBCSD), No. 58. [Online] available: http://www.natural-resources.org/minerals/cd/docs/mmsd/topics/058_downing.pdf [16 May 2009]

Duffy , M. (1985). *Designing research the qualitative –quantitative debate*. Journal of Advanced Nursing, Vol. 11, No. 3, pp. 225-232.

Ellis, F. (2000). *Rural livelihoods and Diversity in Developing Countries*. Oxford University Press, New York

Ellis, F. (2003). *A livelihoods Approach to Mitigation and Poverty Reduction*. Paper Commissioned by DFID, University of East Anglia.

Erlichman, S. (2003). *Ecohealth and Displacement: A case study of Resettlement and Return in Ethiopia*. Faculty of Environmental Studies outstanding graduate student paper series, Vol. 7, No. 1, Faculty of Environmental studies, York University, Toronto, Ontario

European Commission - Humanitarian Aid Office (ECHO) (2007). *Ethiopia: Humanitarian assistance to populations affected by epidemics, malnutrition, climatic hazard, resettlement, and conflict.* [Online] Available: http://www.reliefweb.int/rw/rwb.nsf/db900sid/LSGZ-76LCBR?OpenDocument. [04 June 2008]

Ezra, M. (2001a). *Ecological Degradation, Rural Poverty, and Migration in Ethiopia*: A Contextual Analysis. No. 149

Ezra, M. (2001b*). Demographic response to environmental Stress in the Drought-and Famine-Prone areas of Northern Ethiopia*. International Journal of Population Geography, Vol. 7, pp. 259-279, Population Council, New York, USA.

Family health international (ND). *Qualitative research methods: A data collector's field guide.* Module 2, participant observation.

Federal Government Food Security Programme Quarterly Bulletin (2007/2008). No. 1

Flick, U.; Kardorff, E. and Steinke, I. (2004). *A Companion to Qualitative Research.* SAGE Publications, London, Thousand Oaks, New Delhi

Fosse, T. (2006*). Migration and Livelihoods- The Voluntary Resettlement Program in Ethiopia.* A master Thesis, Norwegian University of Life Sciences, Department of International Environment and Development Studies (Noragric), Norway. [Online] available: http://www.umb.no/noragric [10 May 2008]

FSCB M&E Task Force (2004). *The New Coalition for Food Security in Ethiopia.* Food Security Programme Monitoring and Evaluation Plan October 2004 – September 2009. [On line] available: http://www.worldbank.org/afr/padi/M&E_Plan.pdf. [09 June 2008]

Gebre, Y. (2002*). Contextual Determination of Migration Behaviours: The Ethiopian Resettlement in Light of Conceptual Constructs.* Journal of Refugee Studies, Vol. 15, NO. 3, Oxford University press

Gebremedhin, B.; Hoekstra, D. and Jemaneh, S. (2007). *Heading towards commercialization? The case of live animal marketing in Ethiopia.* Improving Productivity and Market Success (IPMS) of Ethiopian farmers project, International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia

Gebreselassie, S. (2006). *Land, Land Policy and Smallholder Agriculture in Ethiopia: Options and Scenarios.* Paper prepared for the Future Agricultures Consortium meeting at the Institute of Development Studies 20-22 March 2006. [online] available: http://www.future-agricultures.org/pdf%20files/SG_paper_2.pdf. [06 June 2009].

Gemenne, F., Pattie, D. And Boulharouf, R. (ND). *Understanding Migration Choices:* The United Nations Convention to Combat Desertification (UNCCD) as a mechanism for developing coping strategies

Goering, D. and Streiner, D. (1996). *Reconcilable Differences: The Marriage of Qualitative and Quantitative Methods.* Research Methods in Psychiatry, the Canadian Journal of Psychiatry, Vol. 41, No. 8, pp. 491–497

Good, B. (1996). *Mental Health Consequences of Displacement and Resettlement*. Economic and Political Weekly, Vol. 31, No. 24, pp. 1504-1508. [Online] available: http://www.jstor.org/stable/4404273 [24 February 2009]

Goodo, S. (2008). *Ethiopia: Chronic Food Insecurity and the Dilemma of Food Aid*. [Online] available: http://www.americanchronicle.com/articles/63637Human rights activist. [19 June 2008]

Gordon, A. and Craig, A. (2001). *Rural nonfarm activities and poverty alleviation in Sub-Saharan Africa*. Policy series 14, Natural resources institute, University of Greenwich

Gujarati (2004). *Basic Econometrics*. 4th ed., the McGraw-Hill Companies

Haan, N.; Majid, Nisar and James Darcy (2006). *A review of emergency food security assessment practice in Ethiopia*. Humanitarian Policy group Report. A study commissioned by and Prepared for the world food programme, Rome.

Haile, S. (2004). *Population, Development, and Environment in Ethiopia*. Special ECSP REPORT , ISSUE 10

Halderman, M. (2004). *The political Economy of pro-poor Livestock Policy Making in Ethiopia*. Pro-poor livestock policy initiative working paper, No. 19

Hammond, L and Dessalegn, B. (2003). Safara: An Assessment of Current and Future Voluntary Resettlement in Ethiopia. Commissioned by USAID-Ethiopia, Clark University

Heitzmann, K.; Canagarajah, R. and Siegel, P. (2002). *Guidelines for Assessing the Sources of Risk and Vulnerability*. Social Protection Discussion Paper Series No. 0218, Social Protection Unit, Human Development Network, the World Bank

Hewitt, K. (1997). *Regions of Risk: A Geographical Introduction to Disasters*. Addison Wesley Longman: Essex

Hines, D. and Balletto, R. (2002). *Assessment of Needs of Internally Displaced Persons in Colombia*. Working Paper 189, Overseas Development Institute, 111 Westminster Bridge Road, London, UK

Hristov, J. (2009). *Assessment of the impact of high fragmented land upon the productivity and profitability of the farms*. The case of the Macedonian vegetable growers. Sveriges lantbruksuniversitet (SLU), Department of Economics, Degree Thesis in Business Administration Uppsala, Thesis 561

Holloway, A. (2009). *Crafting disaster risk science*: Environmental and geographical science Sans frontières. Gateways: International journal of community research and engagement, Vol. 2, pp. 98-118

Ibarra, Carolina (2005). *Building Bridges: The Role of Human Capital and Social Capital in the Migration Experience of Mexicans in the Vancouver Metropolitan Area.* Master's Thesis in International and European Relations, Linköping University

IPMS Team (2005). *Metema Pilot Learning Site Diagnosis and Program Design.* [Online] Available: www.ipms-ethiopia.org/content/files/Documents/PLS-DPD/Metema.pdf. [09 June 2008].

Jacobsen, K. (2002). *Livelihoods in Conflict: The Pursuit of Livelihoods by Refugees and the Impact on the Human Security of Host Communities.* International Migration Vol. 40,No. 5, Blackwell Publishers Ltd., Oxford , UK, and, Malden, USA

Jaspars, S., O'Callaghan and Stites, E. (2007). *Linking livelihoods and protection*: A preliminary analysis based on a review of the literature and agency practice. Humanitarian Policy Group (HPG) working paper, overseas Development Institute

Ketema, D. (2008). *Social Networks and Diffusion of Agricultural Technology: The case of Sorghum in Metema Woreda, North Gondar, Ethiopia.* A master's thesis Submitted to the Department of Rural Development and Agricultural Extension, School of Graduate Studies, Haramaya University, Ethiopia

Koenig, D. (2001). *Toward Local Development and Mitigating Impoverishment in Development-Induced Displacement and Resettlement*. Final Report Prepared for ESCOR R7644 and the Research Programme on Development-Induced Displacement and Resettlement organized by the Refugee Studies Centre, University of Oxford.

Kollmair, M and Gamper, S. (2002). *The sustainable livelihoods approach*. Input paper for the integrated training course of NCCR North-South Aeschiried, Switzerland

Kothari, U. (2002). *Migration and Chronic poverty.* Working paper no 16, chronic poverty research centre, institute for development policy and management, University of Manchester

Lakew, E. (2006). *The Persistent Food Crisis in Ethiopia: Causes, Government Responses and Household Strategies:* The Case of Enebse Sar Midir District. MPhil Thesis in Development Studies, Submitted to Geography Department, Faculty of Social Sciences and Technology Management,

Norwegian University of Science and Technology (NTNU), Trondheim, Norway. [Online] Available: http://www.diva-portal.org/diva/getDocument?urn_nbn_no_ntnu_diva-753-1__fulltext.pdf [05 June 2008]

Lambert, R. (1994). Monitoring local food security and coping strategies: lessons from information collection and analysis in Mopti, Mali, *Disasters* **18** (4) (1994), pp. 322–343.

Lassailly-Jacob, V. (ND). *Reconstructing Livelihoods through land settlement Schemes:* Comparative reflections on refugees and oustees in Africa.

Lautze, S.; Aklilu, Y.; Raven-Roberts, A.; Young, H.; Kebede, G.; and Leaning, J. (2003). *Risk and Vulnerability in Ethiopia: Learning from the past, Responding to the present, Preparing for the future.* A Report for the U.S. Agency for International Development

Legesse, B. (2000). *Smallholders' risk perception and coping strategies: The case of Kersa and Babile, Eastern Ethiopia.* A Master Thesis No. 5, Swedish University of Agricultural Sciences, Department of Rural Development Studies, Uppsala, Sweden.

Little, P. (2008). *Food Aid Dependency in Northeastern Ethiopia: Myth or Reality?* World Development, Vol. 36, No. 5, pp. 860–874, Elsevier Ltd

Lovendal, C. and Knowles, M. 2006. *Tomorrow "s Hunger. A Framework for Analysing Vulnerability to Food Insecurity.* World Institute for Development, Economics Research. United nations University.

Macqueen, D. (2001). *Measurement malaise: is the SL approach inoperable?* Natural Resources Institute, Chatham.

Maddala, G. (1992). *Introduction to Econometrics.* 2nd ed, Macmillan publishing company, New York, US.

Mahmood. R. (1995). *Emigration dynamics in Bangladesh.* International Migration, No. 33, pp. 699–726

Manyena, S. (2006). *The concept of resilience revisited. Journal of disasters.* vol. 30, No. , pp. 433-450. Blackwell publishing, Oxford, UK and Malden, USA

Maxwell, S. and Smith, M. (ND). *Household food security*: A conceptual review.

Maxwell, D., Webb, P., Coats, J. and Wirth, J. (2008). *Rethinking food insecurity in humanitarian response.* Paper presented to the food security forum, Rome

Maydell-Stevens, E.; Masgoret, A.M. and Ward, T. (2007). *Problems of Psychological and Sociocultural Adaptation among Russian-Speaking Immigrants in New Zealand.* Social Policy Journal of New Zealand, Issue 30

Mberu, B. (2006). *Internal migration and household living conditions in Ethiopia.* Demographic Research, Vol. 14, Article 21, Pp. 509-540. Max Planck Institute for Demographic Research, Rostock, Germany. [Online]Available: http://www.demographic-research.org/Volumes/Vol14/21/ [05 May 2008]

McDowell, C. And de Haan, A. (ND). *Migration and Sustainable livelihoods: A critical review of the literature*. IDS working paper 65

Mcleman, R. And Smit, B. (2006). *Migration as an adaptation to climate change*. Vol. 76, pp 31-53, department of geography, university of Guelph, Guelph, Canada

Meinzen-Dick, R. and Adato, M. (2001). *Applying the Sustainable Livelihoods Framework to Impact Assessment in Integrated Natural Resource Management*. International Food Policy Research Institute, Paper presented at Workshop on Integrated Management for Sustainable Agriculture, Forestry and Fisheries, 28 – 31 August 2001, Cali, Colombia

Metema District Task Force (January 2005). *An Evaluation Report on 2003-2005 Resettlement programmes performance in Metema district written in Amharic.*

Ministry of foreign affairs (ND). *A General History of Ethiopia.* [Online] Available: http://www.mfa.gov.et/Facts_About_Ethiopia/Facts.php?Page=General_Profile_2.htm [30 June 2008]

Moorlag, E., O Chocka, J., Janzen, R. and Marsh, S. (2008). *Seeing the "C" in community University partnerships: Pathways between diversity engagement and community research.* Centre for community based research, proceedings 199

Moser, C. (1998). *The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies.* World Development, Vol. 26, No. 1, pp. l-19.

New Coalition for Food Security in Ethiopia (2003). *Voluntary Resettlement Programme (Access to improved land),* Vol. II, Addis Ababa. [Online] Available: www.unmillenniumproject.org/documents/ethiopia_vrp.doc. [30 May 2008]

Nieboer, A.; Lindernberg, S.; Boomsma, A. and van Bruggen, A. (2005). *Dimensions of Wellbeing and their measurement*. The SPF-IL Scale, Social indicators Research, No. 73, pp, 313-353.

Nilsson, P-O (2002). Local *Management of natural Resources. A case study of Local communities relations to protected areas.* Master's thesis, No. 14, Swedish University of Agricultural science, Department of Rural Development Studies, Uppsala, Sweden.

O'Keefe, P., K. Westgate and B. Wisner (1976) 'Taking the naturalness out of natural disasters'. *Nature*. 260. pp. 566–567.

Ota, A. (2001).Reconstructing Livelihood of the Displaced Families in Development Projects: Causes of Failure and Room for Reconstruction. Paper presented at the conference Livelihoods and Poverty Reduction: Lessons From Eastern India. http://www.anthrobase.com/Txt/O/Ota_A_02.htm

Pankhurst, A. (1992). *Resettlement and Famine in Ethiopia: The villagers' experience*. Manchester, Manchester University Press

Pelling, M. 2003. *The Vulnerability of Cities: Natural Disasters and Social Resilience*. Earthscan: London

Refugees international (2004). *Ethiopia: The Struggle for Food Security.* RI Bulletin

Pascal O. Girot (ND). *Conserving the Peace: Resources, Livelihoods and Security*. Overview B– Environmental degradation and Regional Vulnerability: Lessons from Hurricane Mitch

Scoones, I. (1998). *Sustainable Rural Livelihoods: A Framework for Analysis.* IDS working paper 72. Institute of Development Studies. Brighton, UK, University of Sussex.

Sewonet , A. (2003*). Intra-regional voluntary resettlement in Amhara: A possible way out of the chronic food trap?* United Nations Development Programme Emergencies Unit for Ethiopia (UNDP-EUE). [Online] Available: http://www.reliefweb.int/rw/rwb.nsf/db900sid/ACOS-64CNUL?OpenDocument [06 June 2008]

Shami, S. (1993). *The social implications of population Displacement and Resettlement: An Overview with a Focus on the Arab Middle East.* International Migration Review, Vol. 27, No. 1, pp. 4-33, The Centre for Migration Studies of New York, Inc. [Online] Available: http://www.jstor.org/stable/2546699 [05 May 2008]

Shahbaz, B. (2008). *Risk, Vulnerability and Sustainable Livelihoods: Insights from Northwest Pakistan.* The Sustainable Development Policy Institute, Project Report Series No. 13

Sharp, K. (2003). *Measuring destitution: integrating qualitative and quantitative approaches in the analysis of survey data.* IDS (Institute of Development Studies) Working Paper 217, Brighton, Sussex

Sherman, N. And Mulindwa, P. (2002). *Refugee resettlement in Uganda.* The Netherlands-Israel Development Research Programme (NIRP) research for policy series 11. Royal Tropical Institute, Amsterdam, the Netherlands.

Silverman, D. (2004). *Qualitative research: theory, method and practice.* 2nd ed. SAGE Publications, London, Thousand Oaks and New Delhi

Smit, B. and Wandel, J. (2006). *Adaptation, adaptive capacity and vulnerability.* Global Environmental Change 16, pp. 282–292, Department of Geography, University of Guelph, Guelph, Ont., Canada N1G 2W1. [Online] Available: http://www.geog.psu.edu/pdf/Smit_Wandel_GEC.pdf. Accessed 17 Jul. 08 [05 July 2008]

Smith, K. (1996). Environmental hazards: *Assessing risk and reducing disaster.* 2nd ed., London and New York: Routledge

Smith, K. and Petley, D. (2009). Environmental hazards: Assessing risk and reducing disaster. London and New York: Routledge

Sustainable Livelihoods Guidance note 10. *Tools for Mainstreaming Disaster Risk Reduction. Sustainable Livelihoods approach. [Online] Available: http://www.proventionconsortium.org/themes/default/pdfs/tools_for_mainstreaming_GN10.pdf accessed 17 Jul. 08 [05 July 2008]*

Sutton, K. (1977). *Population Resettlement - Traumatic Upheavals and the Algerian Experience.* The Journal of Modern African Studies, Vol. 15, No. 2, pp. 279-300. Cambridge University press: http://www.jstor.org/stable/159922 Accessed: 24/02/2009

Tadele, F. (2006). *Migration and rural livelihood in Ethiopia: Case studies of five rural sites in Amhara, Oromia and SNNP regions.* A paper presented to the 4th international conference on Ethiopian economy, draft report.

Tadesse, A. (ND). *Resettlement and food security with reference to the Ethiopian experience:* The Boreda case. Catholic Church Community Based Integrated Development Program, Southern region of Ethiopia

Tadesse, D. (2008). *Access and Utilization of Agricultural Information by Resettler Farming Households:* The case of Metema Woreda, North Gondar, Ethiopia. A master's thesis submitted to the department of rural development and agricultural extension, school of graduate studies, Haramaya University, Ethiopia

Tegegne, A.; Mengistie, T.; Desalew, T.; Teka, W. and Eshete, D. (2009). Transhumance cattle production system in North Gondar, Amhara Region, Ethiopia: Is it sustainable? Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project, International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia. Working Paper No. 14

Tesfahun, G.; Adgo, T. and Yassin, S. (ND). *Agricultural Development Efforts and Lessons of a Decade in the Amhara National Regional State, Ethiopia.* [Online] Available: http://www.ipms-ethiopia.org/content/files/Documents/workshops-Meetings/Project_Launching/Agricultural%20Development%20(Amhara).pdf [06 June 2008]

Thomson, A. (2001). *Food security and sustainable livelihoods: The policy challenge*. The society for international development, Vol. 44,No. 4, pp. 24-28.

Twigg, J. (2001). *Sustainable Livelihoods and Vulnerability to disasters*. Benfield Grieg hazard research Centre, Disaster Management Working Paper 2

U.S. department of state, Bureau of African Affairs (2008). *Background Note: Ethiopia.* [Online] Available: http//www.state.gov/r/pa/ei/bgn/2859.htm [23 May 2008]

UNDP-GEF (2006). *Coping with Drought and Climate Change. Medium Sized project proposal Request for GEF Funding, Ethiopia.* [Online] Available: www.gefonline.org/.../Resubmission%20Ethiopia%20CwD%20Nov%201(2).doc [06 June 2008]

United Nations Capital Development Fund (ND). *Local Development Project (LDP), North Gondar Zone, Amhara National Regional State.* [Online] Available; http://www.uncdf.org/english/countries/ethiopia/local_governance/project_documents/uncdf_eth-prodoc2005.pdf [27 June 2008]

UN/ISDR. 2004. *Disaster Risk Reduction: 1994-2004*. 3 part CD

UN/ISDR. 2005. *Hyogo Framework for Action 2005 –2015 : Building the Resilience of Nations and Communities to Disasters*, World Conference on Disaster Reduction: 18-22 January 2005, Kobe, Hyogo, Japan. Available at: http://www.unisdr.org

USAID Collaborative Research Support Programs Team (2000). *Amhara National Regional State Food Security Research Assessment Report.* [Online] Available: http://crsps.org/amhara/amhara_rpt.PDF [06 June 2008]

Van Hoorn, André (2007). *A Short Introduction to Subjective Well-being: Its Measurement, Correlates and Policy Uses. Is happiness measurable and what do those measures mean for policy?* Organized by the Bank of Italy, the Centre for Economic &International Studies (CEIS), the Joint Research Centre of the European Commission and the Organization for Economic Cooperation and Development (OECD), University of Rome 'Tor Vergata

Von Braun, J. and Olofinbiyi, T. (2007). *Famine and Food Insecurity in Ethiopia*. Case study #7-4 of the Program: "Food Policy for Developing Countries: The Role of Government in the Global Food System". Cornell University, Ithaca, New York

Waktola, A. (1999). *Exploratory Study of two regions in Ethiopia to Identify target areas and partners for intervention*. Drylands Coordination Group, Report No. 6

Wisner, B., Blaikie, P., Cannon, T. and Davis, I. 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. Routledge: New York

Woldemeskel, G. (1989). *The Consequences of Resettlement in Ethiopia*. African Affairs, Vol. 88, No. 352, pp. 359-374, Oxford University Press. [Online] Available: http://www.jstor.org/stable/722691 [13 May 2008]

Yamane, T. (1967). Elementary Sampling Theory. Prentice-Hall, Englewood Cliffs, N.J., USA

Yehual, S. (2008). *Determinants of Smallholder Farmers Access to Formal Credit: The Case of Metema Woreda, North Gondar, Ethiopia*. A Master Thesis Submitted to the Faculty of the Agriculture Department of Rural Development and Agricultural Extension, School of Graduate Studies, Haramaya University

Yntiso, G. (2009). *The Metekel Resettlement in Ethiopia: why did it fall?* In Pankhurst, A. and Piguet, F. (2009). Moving people in Ethiopia: Development, Displacement and the state. East Africa series, Suffolk, UK and New York, USA: James Currey

Ziegler, J. (2005). *Economic, social and Cultural Rights: The right to food Report of the Special Rapporteur on the right to food*. Addendum Mission to Ethiopia. United Nations, Economic and Social Council, Commission on Human Rights, Sixty-first session, Item 10 of the provisional agenda.

Zou, H., Hastie, T. and Tibshirani, R. (2004) Sparse Principal Component Analysis. [Online] Available: http://www-stat.stanford.edu/~hastie/Papers/sparsepc.pdf [16 March 2010]

www.afro.who.int/hac/mission_reports/consultancy-report-%20ahmara.pdf

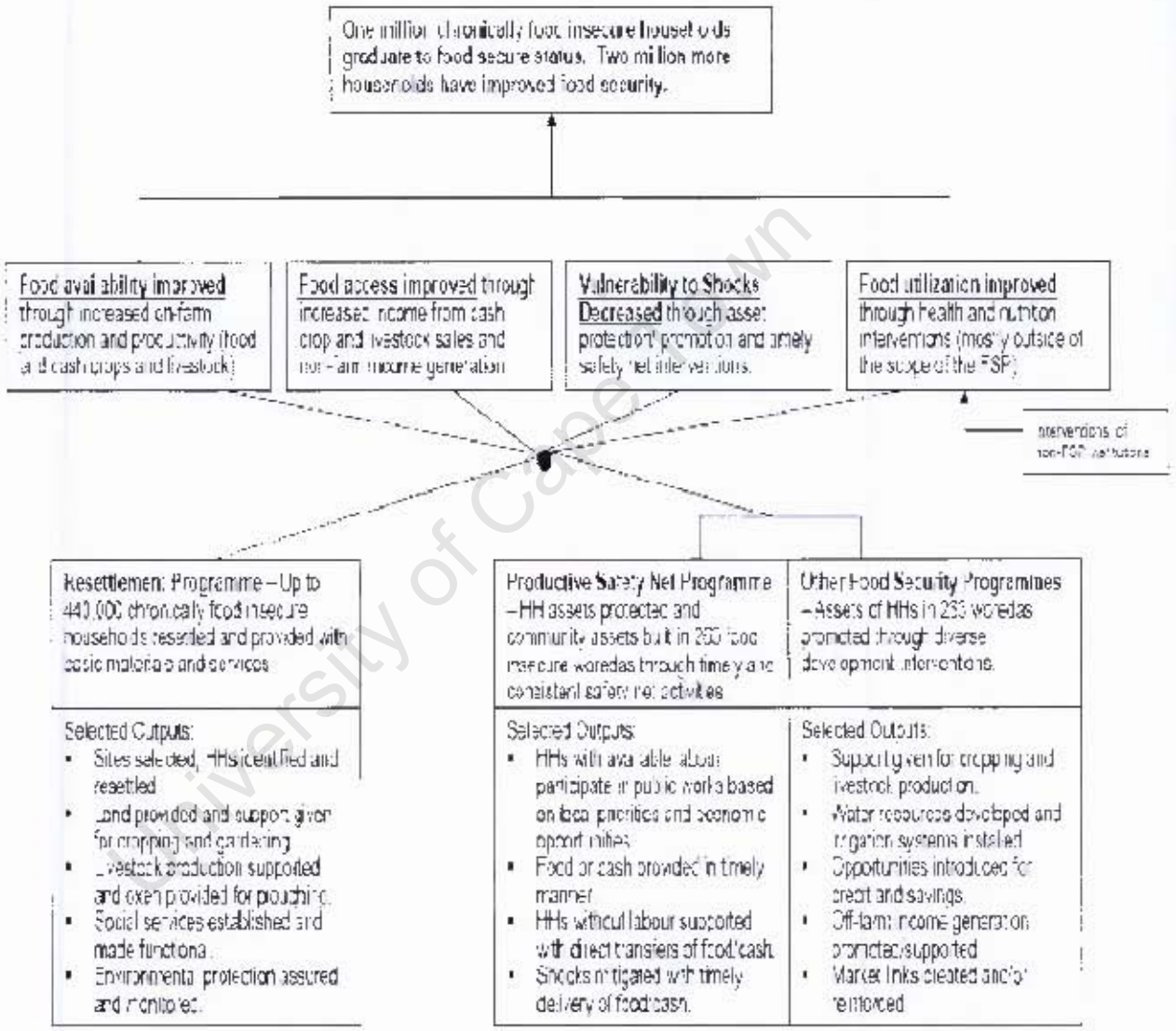
www.ethiodemographyandhealth.org

http://economics.about.com/od/economicsglossary/g/probitmodel.htm

APPENDICES

Appendix 1: Food Security programme of Ethiopian Government

Figure 1: Graphic Representation of the Food Security Programme Logical Hierarchy of Objectives



Source: (Food Security Coordination Bureau M&E Task Force 2004)

Appendix 2: Household Survey Questionnaire

Household Survey Questionnaire

A. General Information

1. Please tell us information about each and every person in this household

Name	sex	Age	Language	Relationship with head of household	Education (years of school Completed)	Marital status	Contribution in the household
				Head			

Contribution: 0=dependent, 1= student (in school), 2=watch after animals, 3=housewife, 4=farming, 5=hired labourer,
6=off-farm activity

Relation to household head: 1=wife, 2=child, 3=grandchild, 4=brother, 5=sister, 6=hired labour, 7=other, specify----------

Marital Status: Single, Married, widowed, Divorced

Education: 0=illiterate, 1=read and write, 2= elementary, 3= church education, 4= secondary 5=other, specify

B. Resettlement process and households perception

1. Originally, from which district are you from? ----------
2. When did you resettled here? ----------
3. Were there sufficient consultations with you or your community prior to resettlement?

Yes		No	

4. Did you decide to resettle voluntarily?

Yes		No	

5. What are your reasons to be resettled? ----------
6. Did you have information about Metema before you resettled?

Yes		No	

7. If yes, how Metema is similar from your expectation or the information you had? ----------
   ----
8. The environment in Metema compared to your original place.
   A). somehow similar B). very similar
   C). somehow different D). very different
9. What kind of support did you receive during the resettlement period? Specify the support you get and from whom. ----------
10. How do you evaluate living standard today and before?
    A). Better B). The same C). Worse
11. Did all of the household members accompany you when you resettled here?

Yes		No	

If no why; and is there any former household member who stayed home still ----------

C. Service provision

1. How do you evaluate your housing now and before?

   A). Better B). The same C). Worse

2. Which schools does your village have for children?

   A). Nursery school B). Kindergarten

   C). Primary school D). Junior high school

3. Are your children attending school now?

Yes		No	

If no why ----------

4. How is the quality of the schools compared to your home area?

   A). Poor B). The same C). Better

5. Is there any household member who was attending school in your home area but dropout now?

Yes		No	

If yes why----------

6. Does your village have healthcare institution?

Yes		No	

7. If yes, are you satisfied with the services?

Yes		No	

If no why ----------

8. How is the health service provision compared to your original place?

   A). Poor B). The same C). Better

9. Where does this household usually collect drinking water from?

   A). Covered well B). Uncovered well C). River/stream

   D). Spring E). Rain water tanks F). Other (specify) ----------

10. How far is it from your house to water resource? ----------

11. How long does it take you to walk to water point, get water, and return home? --------

12. How is its proximity compared to the water source in your home area?

A). Far than home area B). The same distance C). Near than home area

13. How far is the market from this village? ----------

14. How is its proximity compared to the market in your home area?

A). Far than home area B). The same distance C). Near than home area

15. Do you think you get fair prices for your products?

Yes		No	

Why----------

16. Do you have access to credit?

Yes		No	

17. If yes what are the source?

A). NGO B). Rotating scheme (Iqube) C). Micro finance institutions
D). Church E). Iddir F). Other (Specify) -------

18. Amount of credit the household gets in the last 12 months----------

19. How do you utilize your credit?

A). Small business B). To buy food C). To pay debts
D). Funeral E). For feast (Maheber) F). To buy cattle
G). Other (specify) ----------

20. How is the credit service provision compared to your original place?

A). Poor B). The same C). Better

D. Major Risks (challenges) to live and Households Adaptation Mechanisms

1. What are the main social, economic, cultural, environmental problems in your household?

A). Lack of seed	B). Pests, locust worms	C). Long dry season
D). Rain failure	E). Abundant rain	F).Lack of draft animals
G). Lack of labour	H). Lack of market	I). Increased in price of goods
J). Lack of fertilizer	K).Other	

2. What diseases are most prevalent in this area? ----------

3. How often did people in your household suffer from Malaria?

A). Very often	B). Often
C). Sometimes	D). Never

4. Is there any household member who has died of malaria or any other disease?

Yes		No	

If yes what age and sex? ----------

5. Was there any time after you came here when you have not been able to meet your food consumption needs?

Yes		No	

6. If yes , number of months per year when all household members have no sufficient food to eat.----------

7. What were the most difficult months to obtain food? ----------

8. Please tell us how the household copes to the problems you mentioned and when you do not have enough food to eat?

A). Borrowing	B). Gifts from relatives	C). Aid from organisations
D). Sold animals	E). Sale of possessions	F). Other (Specify) ---------

9. How is food amount comparing with before resettlement?

A). Worse	B). The same	C). Better

10. Did any of your crops suffer from any of the following factors? Fill "yes "or "no"

Flooding/water logging	Wind/storm	Plant diseases	Insects	Birds/other animals	Weed damage	Other specify

E. Households Sources of Livelihood and opportunities for change

1. What was main income of your family before you resettled here?

   A). Farm income B). Wages C). Small trade

   D). Livestock E). Other ----------

2. What crops did you grow before you resettled here? ----------

3. What resources did you brought from your home area?

   In kind----------

   In birr----------

4. Do you have farmland in your home area?

Yes		No	

5. If yes how many hectares----------

6. What do you do with the land you have in your home area now? ----------
   ----

7. Have you received land as you informed before resettlement?

Yes		No	

8. How many hectares do you receive? ----------

9. Distance of your farm land from the nearest river ----------

10. Distance of your farm land from home ----------

11. Do you farm all the land you own?

Yes		No	

12. If no what are the reasons for not farming all the land you own?

A. Could not obtain oxen at the right time

B. Farmer or other household members were too ill to do work at the right time

C. Could not obtain outside labour at the right time

D. Lack of agricultural inputs like seed

E. Other reasons (specify) ----------

13. If your answer is no for number 10 what do you do with the land you own and do not farm?

A). Sharecropping out land B). Renting out land

C). Left unploughed D). Grazing

E). Other (specify) ----------

14. List plots rented out, sharecropped out, left unploughed etc.

A). Sharecropping out ---------- B). Renting out land ----------

C). Left unploughed ---------- D). Grazing ----------

E). Other ----------

15. Comparison of fertility of land now and before

A). Better B). The same C). Lower

16. Is the agriculture system the same as your home area?

Yes		No	

17. If no what is the difference and how do you adapt to it ----------

18. What tools you use for production?

A). Own Draft animals B). Draft animals rented

C). Shared with another household D). Borrowed (free)

E). Rented (for cash) F). Exchanged labour for draught power

G). Own tractor H). Tractor rented

I). Hand tools J). Other (specify) ----------

19. Do you receive any technical supports or helps in agricultural production from agricultural extension workers or anybody else?

Yes		No	

20. Would you please tell us the supports you received? ----------

21. Would you please tell us about your production this year?

Type of crop (cereal and cash)	**Output in Kg**	**Unit price per Kg**	**Total value in birr**	**Remark**
maize				
Cotton				
Sesame				
rice				
corn				

22. Income you get from sales of the following in the last 12 months

Income sources	**Quantity**	**Unit Price**	**Total Value**
Live cattle			
Live Sheep/Goat			
Hide/Skin			
Butter/Cheese			
Milk/Cream			
Dung cakes			
Chicken			
Eggs			
Sales of gum/incense			

23. Please indicate your current household's cash income other than farm income.

Source of income	Seasonality (when is activity carried out)	Estimated amount in the last 12 months (in birr)	Remark

24. Trends of household's non-farm income compared to home area

A). Increased B). Decreased C). The same

25. Number of income sources compared to home area for your household

A). Increased B). Decreased C). Stayed the same

26. Do you own animals?

Yes		No	

If yes please specify

Type	Number	Remark
Oxen		
Chickens		
Goats		
Sheep		
Cattle		
Donkey/horse/mule		
Bee hives		

27. List Valuable assets the household has now. ----------

28. Did the resettlement programme create new opportunities than your home area for you?

Yes		No	

29. If yes what are these opportunities? ----------

30. Are you benefited from the opportunities available?

Yes		No	

31. If no what do you think should be done to use these opportunities? ----------

F. Family Networks, Savings and expenditure

1. Do you have relatives in your village?

Yes		No	

If yes:

a) Do you help each other with farm and/ or other work?

Yes		No	

b) Do you give or receive food to/from these relatives?

Yes		No	

c) Do you give or receive cash to/from these relatives

Yes		No	

d) Have these forms of mutual aid increased, decreased or stayed the same compared to home areas? ----------

2. Do you have relatives who live outside this village?

Yes		No	

3. If yes do you receive help from them (money, food)?

Yes		No	

4. Do any members of the household participate in local institutions (like: Rotating credit schemes, Iddir, Farmers society or organization etc)?

Yes		No	

5. Do you have any savings?

Yes		No	

6. If yes, how do you save?

A). Cash in hand B). Group savings C). Other (specify) ----------

7. If so, how do you use your savings? ----------

8. Consumption expenditure (for the last 12 months from the date of survey)

Commodity	**Unit**	**Number of units consumed**			**Average unit market price (in Birr)**	**Total Expenditure in Birr**	**Remark**
		Own production	**Free**	**Bought**			
Teff	kg						
Wheat	kg						
Barley	kg						
Sorghum (mashila)	kg						
Maize	kg						
Bean and pea	kg						
Rice	kg						
Cabbage							
Pepper							
Shiro	kg						
Lentils	kg						
Cooking oil	litre						
Salt (chew)	kg						
Coffee	kg						
Tomato	kg						
Onion	kg						
Tella (gesho etc)							
Naphta, diesel oil	litre						
Sheep							
Goat							
Chicken							
Eggs							

Milk	litre						
Sugar	kg						
Clothing	Pieces						
Shoe							
Soap							
School fee							
Iddir (burial group)							
Feast (Maheber)							
Medical							
Church Contribution							

Appendix 3: Focus group interview checklist for Community members

1. Why you decide to move?
2. Did you receive any kind of help? What and from whom?
3. What were you farming in your home place? What crops are you producing now?
4. Do you believe the land currently you have enough and fertile?
5. How is access to health, education, market, water, credit compared to home area?
6. What are the most important needs of this community?
7. How are the options for Non-farm income compared to home areas?
8. What do you see as the most serious problems facing the people now?
9. When do you think these problems are severe? Why
10. Which groups of people do you think are more vulnerable to?
11. How people cope in response to these problems and livelihood threats in this community?
12. What do you see as the solutions to these problems?
13. In your thought do you think that it was a right decision to be resettled? Why?
14. What opportunities do you notice in terms of income, assets, employment, access to services, access to public lands, etc in this place?
15. What are the constraints to be benefited from these opportunities if any?
16. How is the relation between the resettled and the host community?

Appendix 4: Survey results

Table 1: Average income by Age

Age	Observation	Mean	STd.Dev.	Minimum	Maximum
20-35	37	11955.49	10375.7	2040	49032
36-50	35	6511.2	6394.699	680	27500
51-65	16	6589.875	3533.945	1780	12100
>65	5	3420.8	1177.179	2100	4610
Total	93	8524.591	8226.64	680	

Source: Author's own survey data 2008

Table 2: Landholding at home area by Age of head of household's (percentage)

Land at home area	Age of household head				Total
	20-35	36-50	51-65	>65	
No	67.6	45.5	18.75	0	48.3
Yes	32.4	54.5	81.3	100	51.7
Total	100	100	100	100	100

Source: Author's own survey data 2008

Table 3:Total Average Annual Income by Gender

Group	Obs	Aver.income	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Female	12	4116.583	638.9352	2213.337	2710.296	5522.87
Male	81	9177.63	954.5815	8591.233	7277.952	11077.31
Combined	93	8524.591	853.0629	8226.64	6830.335	10218.85
diff		-5061.046	2503		-10032.95	-89.14391

diff = mean(F) - mean(M) t = -2.0220
Ho: diff = 0 degrees of freedom = 91

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0231 Pr(|T| > |t|) = 0.0461 Pr(T > t) = 0.9769

Source: Author's own survey data 2008

Table 4: Non-farm income by Gender

Gender of head of household	Observation	Mean (In birr)	Std.Dev.	Minimum (In birr)	Maximum (in birr)
Female	12	304	439.2	0	1,300
Male	81	873	2378	0	13,520

Source: Author's own survey data 2008

Table 5: Total average annual income by household's year of resettlement

Year of Resettlement	Observation	Mean (in birr)	Std.Dev.	Minimum (in birr)	Maximum (in birr)
2002/2003	44	5,874	4607.6	680	25,468
2003/2004	10	14,029	9050	2,820	28,500
2004/2005	39	10,103	10087	1020	49,032
Total	93	8,524.6	8226.6	680	49,032

Source: Author's own survey data 2008

Table 6: Households with Non-farm income by location

Location	Have non-farm income (% of sampled households)		Total
	Yes	No	
Wodi-Gemzu	**21.1**	**78.9**	**100**
Das-Gundo	**14.8**	**85.2**	**100**
Kumer	**22.3**	**77.7**	**100**
Total	**19.2**	**80.8**	**100**

Source: Author's own survey data 2008

Table 7: Woreda estimate of potential income for settler households

Activity	Expected annual income in birr	% of total income
Incense harvesting	3,600	43.6
Crop production	2,645	32
Wage labour	1,200	14.5
Livestock	811	9.8
Total	**8,256**	**100**

Source: Hammond and Dessalegn (2003)

Table 8: Farm plots distance from Village in minutes walk on average

Plots	Resettlement Sites			Average distance in minutes walked
	Kumer	Das-Gundo	Wodi-Gemzu	
Nearest plot	56.27	48.74	37.27	47.40
Remote plot	84.44	89.25	56.84	79.02

Source: Author's own survey data 2008

Table 9: Years of Households Resettlement

Year	Location			Total
	Wodi-Gemzu	Das-Gundo	Kumer	
2002/2003	0 0.00	25 80.65	19 61.29	44 47.31
2003/2004	10 32.26	0 0.00	0 0.00	10 10.75
2004/2005	21 67.74	6 19.35	12 38.71	39 41.94
Total	31 100.00	31 100.00	31 100.00	93 100.00

Table 10: Non-farm Income by sex

Sex	Obs	Mean	Std. Dev.	Min	Max
Female	12	304.1667	439.2444	0	1300

	Obs	Mean	Std. Dev.	Min	Max
Male	81	872.963	2378.332	0	13520

Appendix 5: Ranking of accessibility to essential services

Essential service	Sub-indicator	Resettlement sites		
		Wodi-Gezu	Das-Gundo	Kumer
Housing		2	2	2
	Accessibility	1	3	3
	Physical condition	1	2	3
	Health staff	1	2	3
Health service	Availability of medicine	1	1	3
	School grade	1	3	3
Education	Physical condition	1	3	3
	Hand pump	1	2	2
	Motorised pump	1	2	1
	streams	1	1	1
Water	River	3	1	1
	Formal (micro)	1	2	2
Credit	Informal	1	1	1
Agricultural extension service		1	1	1
Road		1	2	3
Total score		**18**	**28**	**32**

Ranking for each service:

Vey poor =1 poor=2 adequate =3

15 sub indicators

Highest score=45 Minimum score=15

Appendix 6: Scaling of sub-indicators and rationale for selection

1. Financial Capital

Financial capital implies access to credit or other income sources, which provide a household different livelihood options. Access to Non-farm income sources and access to credit were considered here.

Non-Farm and off-Farm income

Non-farm and off-farm incomes are a source of cash that enables a farm household to purchase food during a drought or after a harvest shortfall. Non-farm income is also a source of farm household savings, used for food purchase in difficult times (Gordon, A. & Craig, A. 2001). It allows the rural poor to smooth out or offset fluctuations in agricultural income that might occur on a seasonal basis (June to October in case of the study area) or as a result of unexpected shocks. This is especially the case in poor countries like Ethiopia where savings, credit and insurance mechanisms are not available in rural areas. In this context, accesses to non-farm and off-farm income sources were considered. Hence, households with no both farm-income and off-farm income were considered more fragile and assigned a value of 0 for scaling, households with off-farm income were considered fragile and assigned a value of 1; and households with access to both off-farm and non-farm income sources were considered less fragile and assigned a value of 2 for scaling.

Credit

Access to good and effective financial and credit services is believed to be one of the most important factors for development. Kebede (1995) as cited in Yehual (2008) explained the importance of credit for the rural poor as follows:

"Credit makes traditional agriculture more productive through the purchase of farm equipment and other agricultural inputs, the introduction of modern irrigation system and other technological developments. Credit can also be used as an instrument for market stability. Rural farmers can build their bargaining power by establishing storage facilities and providing transport system acquired through credit. Credit plays a key role in covering consumption deficits of farm households. Moreover, credit encourages savings and savings held with rural financial institutions that could be channeled to farmers for use in agricultural production."

Thus the household with credit access is in a better position than the household with no access. Here, since the only credit provider in the sites were ACSI consideration is given whether the household has credit access from ACSI or not; and 0 value was assigned for those with no access and value of 1 for those with access to it.

2. Human Capital

Education

Education of household members is critical in enhancing or undermining the capability of household on their efficiency in any productive activities or applying modern agricultural technologies. It also helps to develop skills to involve in the more remunerative non-farm activities. Hence, a household having better educated members has greater chances of success than a household with less educated members does.

In this study, the highest education attained in the household was used to develop the index. The values assigned for scaling were: zero for those household with all members have no education, 1 for those households with a member/s having attained to grade 3 or who can read and write, 2 for those households with a member/s having attained grade 4-8, and 3 for those with a member/s having attained grade 9 and above.

Age of head of household

Age is an important dimension of human capital. In this study the preliminary findings before the index showed that the older the household head the more difficult it was to adapt the new environment and new agriculture systems. Average annual income of young headed households (age 20 to 35) was higher than the average annual income of the other age groups; and even it was three times that of the annual income of the elder headed households (those aged greater than 65 years).

This was because: the environment was too harsh and demand hard labour; older people have more attachments to their original areas than the young ones; it was also found that older persons had options as they had land in their original areas than young ones. Therefore, the chance life adaptation to the resettlement site is high for younger-headed households than older-headed ones.

The values assigned for scaling were: zero for those household whose head is aged ≤20 and ≥65, 1 for those households whose head is aged 50 to 65, 2 for those households whose head is 36-50, and 3 for those whose head is aged 20-35.

Family size

Family size affects the ability of a household to supply labour to farming activities and non-farm activities. In most parts of Ethiopia as Sharp (2003) noted "working-age is close to meaningless". This is because Ethiopia is one of the country with the highest child-labour rate in the world, and elders work until they go down. So generally a household with large family members mean more income or more diversified livelihood option.

However, the focus group discussion in this study assures that support from child labour is very low due to the harsh environment and due to the risk of being attacked by wild animals. Furthermore, the survey findings before the index indicates older headed households are less favourably adapted to the environment. Consistent with this, a focus group participant at Das-Gundo mentioned that:

"Unlike our home area where children have been keeping crops from bird attacks, it is difficult here to protect crops from bird by keeping watch the whole day in the farms, due to the harsh environmental conditions. Moreover, the farm areas are far away from the village to do so. Besides, children could not look after livestock because of theft problems and the existence of wild animals (especially snake called Sizra) in the woodlands where grazing land is abundant".

(Source; Author's field notes, December 2008)

Therefore, for scaling the actual number of working age group (15-65) has been considered.

Marital status

Marital status determines the presence of adult labour. Being a single female-headed decrease the chances of adult male labour for farm work. Similarly, being a single male-headed household mean absence of adult female for house work and in taking care of children. Therefore, for scaling a value of 0 was assigned for single female headed households, 1 for single male headed households and 2 for married households. Note that those who reported they are widowed and divorced are considered here as single.

3. Physical Capital

Capital in the context of this study implies productive assets which the household has produced, accumulated or invested in; which have a market value and can be liquidated through sale or exchange; and which can be used to generate future income or assets (after Sharp 2003) . Livestock is a productive asset in the context of the research area as it fulfils all the criteria. In addition to its importance as a means of income, livestock is a source of saving, of labour power in farming activities and of labour power for transporting goods to and from the market. Possession of livestock is reportedly very important for the potential to cope it provides in times of shocks in Ethiopia (Tegegn et al., 2009).

Livestock holdings

In the context of the study area wealth is determined by the cultivated land holding of households as well as by livestock holding. The scaling was made by classifying households in to three different wealth groups subjectively based on the qualitative and secondary information from the Livelihood Integration Unit. The scaling for each of the different livestock type is presented in a table as follows.

Livestock type	Very poor	Poor	Better-off
oxen	0	1	≥2
cow	0	1-2	≥3
shoats	1-2	2-5	>5
Donkey	0	1	≥2

4. Social Capital

Relatives

Here consideration was given whether the household has relatives in the village to ask for any help or not.

Informal social institutions

"Iddir" and "Iqub" are the most prominent social institution in most parts of the regional state of Amhara and both play vital roles in not only livelihood improvement but also in risk reduction during

times of drought and other shocks (Ketema 2008). Therefore, a household who participate in these institutions has better coping capacity to food insecurity than a household who is not a member of these institutions. Therefore, consideration was given whether the household has involved in such social institutions or not.

5. Natural Capital

Land

Natural capital represents resources or endowments from nature. The survey result indicated that on average income from crop production contributed 83.4 percent form household's total income. Furthermore, the survey showed that the majority of households' income is derived from crop production. Therefore, as a natural capital land is the major determinant of livelihood in the sites. For developing the "livelihood fragility" index since each of the resettled households have been given 2 hectares of land, the overall productivity of land was considered taking the per capita income from crop production for each sampled household. In the livelihood fragility index, this was taken as a simple continuous variable. For scaling, the actual maximum and minimum value is taken.

Distance of farm from Dwelling

A farm that is far from village is more difficult than a farm that is more accessible. Hence, the closer the distance the more productive the household will be and vice versa. In this study farm distance was estimated how far the farm is from the village for each household in minutes. For scaling, the actual minimum and maximum values were considered. Note that the inverted formula is used as the higher values are inversely related to positive livelihood.

Appendix 7: Principal component and total variance explained

Component	Initial Eigen values		
	Total (Eigen values)	% of Variance	Cumulative %
1	2.397	17.119	17.119
2	2.100	14.997	32.116
3	1.600	11.429	43.544
4	1.396	9.975	53.519
5	1.056	7.543	61.062
6	.965	6.892	67.955
7	.905	6.463	74.418
8	.876	6.254	80.672
9	.643	4.592	85.264
10	.510	3.642	88.907
11	.457	3.265	92.172
12	.408	2.912	95.084
13	.383	2.732	97.816
14	.306	2.184	100.000

(SPSS output table)

Appendix 8: Weights of indicators based on the first principal component

Sub-indicators	Score (Weight)	Mean	Standard Deviation
Income from crop production	0.193	.207612	.2019644
Farm distance from dwelling	0.057	.209416	.1576107
Non-farm income source	0.037	.27	.448
Access to credit	0.198	.33	.473
Age of head of household	0.096	.665	.2909
Marital status of head of household	0.104	.858	.3212
Number of Working group household member	0.109	.418831	.2238379
Highest education in the household	0.129	.337121	.2790896
Oxen ownership	0.312	.426	.4257
Cow ownership	0.081	.165	.2595
Ownership to shoats	0.225	.188	.2766
Ownership to donkey	0.28	.40	.492
Relatives to receive help	0.153	.42	.496
Membership to social institution	0.176	.07	.254

(SPSS output table)

Appendix 9: Overall household livelihood fragility index

1. Kumer

Household	Dj	Scaled index value	Livelihood fragility level
1	1.49	0.76	A
2	0.31	0.53	B
3	1.05	0.68	B
4	0.43	0.56	B
5	-2.22	0.04	C
6	-1.28	0.22	C
7	-0.55	0.36	B
8	-0.31	0.41	B
9	-1.18	0.24	C
10	-0.82	0.31	C
11	-0.25	0.42	B
12	0.36	0.54	B
13	-0.67	0.34	C
14	0.17	0.51	B
15	0.51	0.57	B
16	0.86	0.64	B
17	1.21	0.71	A
18	-1.67	0.15	C
19	-0.37	0.40	B
20	1.47	0.76	A
21	0.90	0.65	B
22	1.30	0.73	A
23	-0.76	0.32	C
24	-2.40	0.00	C
25	-0.45	0.38	B
26	0.32	0.53	B
27	-0.36	0.40	B
28	-0.06	0.46	B
29	-0.48	0.38	B
30	-0.36	0.40	B
Average		**0.48**	**B**

2. Wodi-Gemzu

Household	Dj	Scaled index value	Livelihood fragility level
1	1.24	0.71	A
2	-0.78	0.32	C
3	-0.08	0.46	B
4	0.71	0.61	B
5	1.46	0.76	A
6	0.13	0.50	B
7	-2.42	0.00	C
8	-0.25	0.42	B
9	-1.87	0.11	C
10	-1.02	0.27	C
11	-0.34	0.41	B
12	1.21	0.71	A
13	0.95	0.66	B
14	1.61	0.79	A
15	-0.88	0.30	C
16	2.71	1.00	A
17	0.10	0.49	B
18	1.20	0.71	A
19	0.91	0.65	B
20	1.23	0.71	A
21	0.36	0.54	B
22	-0.09	0.45	B
23	-0.16	0.44	B
24	-0.66	0.34	C
25	-0.98	0.28	C
26	0.26	0.52	B
27	0.91	0.65	B
28	-0.24	0.42	B
Average		**0.54**	**B**

3. Das-Gundo

Household	Dj	Scaled index value	Livelihood fragility level
1	-0.09	0.45	B
2	2.52	0.96	A
3	-0.20	0.43	B
4	1.80	0.82	A
5	0.93	0.29	C
6	1.27	0.72	A
7	-0.35	0.40	B
8	-0.56	0.36	B
9	1.18	0.70	A
10	0.74	0.62	B
11	-0.73	0.33	C
12	-0.46	0.38	B
13	-0.24	0.43	B
14	0.05	0.48	B
15	0.40	0.55	B
16	-0.12	0.45	B
17	-0.55	0.36	B
18	-0.09	0.45	B
19	-0.37	0.40	B
20	-0.19	0.44	B
21	0.60	0.59	B
22	0.29	0.53	B
23	-0.33	0.41	B
24	-0.86	0.30	C
25	-0.70	0.33	C
26	-0.92	0.29	C
27	-1.27	0.22	C
28	0.24	0.52	B
29	-0.11	0.45	B
30	-0.15	0.44	B
Average		**0.49**	**B**

Appendix 10: Natural capital fragility index

1. Kumer

Household	Income Wi(aij-mj)/si	Farm distance Wi(aij-mj)/si	Dj	Scaled index value	Fragility scale
1	-0.01	-0.17	-0.18	0.21	C
2	-0.21	-0.17	-0.38	0.16	C
3	0.11	0.16	0.26	0.34	C
4	-0.01	-0.17	-0.18	0.21	C
5	-0.13	-0.17	-0.30	0.18	C
6	0.48	-0.17	-0.64	0.08	C
7	-0.38	-0.17	-0.55	0.10	C
8	-0.34	-0.17	-0.51	0.12	C
9	-0.37	-0.17	-0.54	0.11	C
10	-0.37	-0.17	-0.54	0.11	C
11	-0.47	-0.17	-0.64	0.08	C
12	-0.29	-0.17	-0.46	0.13	C
13	-0.37	-0.17	-0.54	0.11	C
14	-0.50	-0.17	-0.67	0.07	C
15	-0.50	0.48	-0.02	0.26	C
16	-0.33	-0.49	-0.83	0.02	C
17	-0.42	0.48	0.07	0.28	C
18	-0.41	-0.17	-0.58	0.10	C
19	0.00	0.81	0.81	0.50	B
20	0.31	0.81	1.12	0.59	B
21	-0.21	0.16	-0.05	0.25	C
22	0.70	-0.17	0.53	0.42	B
23	-0.44	-0.17	-0.61	0.09	C
24	-0.59	-0.17	-0.76	0.04	C
25	-0.38	0.48	0.10	0.29	C
26	-0.50	-0.17	-0.67	0.07	C
27	-0.48	-0.17	-0.65	0.08	C
28	-0.20	-0.17	-0.37	0.16	C
29	0.74	1.79	2.53	1.00	A
30	-0.50	-0.17	-0.67	0.07	C
Average				**0.25**	**C**

2. Wodi-Gemzu

Household	Income Wi(aij-mj)/si	Farm distance Wi(aij-mj)/si	Dj	Scaled index value	Fragility scale
1	1.42	-0.17	1.25	0.63	B
2	-0.35	-0.17	0.32	0.37	C
3	-0.03	-0.17	-0.20	0.21	C
4	-0.28	-0.17	-0.45	0.13	C
5	1.14	0.48	1.62	0.74	A
6	1.11	0.81	1.92	0.82	A
7	0.19	-0.49	-0.30	0.18	C
8	-0.42	-0.49	-0.91	0.00	C
9	-0.04	-0.17	-0.21	0.20	C
10	-0.46	-0.17	-0.63	0.08	C
11	-0.24	-0.17	-0.41	0.15	C
12	0.26	-0.17	0.09	0.29	C
13	1.30	-0.49	0.81	0.50	B
14	0.73	-0.17	0.56	0.43	B
15	2.10	-0.17	1.93	0.83	A
16	-0.39	-0.17	-0.56	0.10	C
17	3.22	1.14	4.36	1.00	A
18	0.00	-0.17	-0.17	0.21	C
19	0.77	0.48	1.26	0.63	B
20	0.10	-0.17	-0.07	0.24	C
21	0.29	1.14	1.42	0.68	B
22	0.97	-0.17	0.80	0.50	B
23	-0.22	0.48	0.26	0.34	C
24	0.12	-0.17	-0.05	0.25	C
25	-0.15	-0.17	-0.32	0.17	C
26	-0.03	-0.17	-0.20	0.21	C
27	1.52	0.16	1.68	0.75	A
28	-0.06	0.48	0.42	0.39	B
Average				**0.51**	**B**

3. Das-Gundo

Household	Income Wi(aij-mj)/si	Farm distance Wi(aij-mj)/si	Dj	Scaled index value	Fragility scale
1	-0.17	0.48	0.31	0.35	B
2	1.36	0.16	1.52	0.71	A
3	-0.24	-0.17	-0.40	0.15	C
4	0.07	-0.17	-0.10	0.24	C
5	0.04	0.16	0.20	0.32	C
6	0.11	-0.17	-0.05	0.25	C
7	-0.09	-0.17	-0.26	0.19	C
8	-0.48	-0.17	-0.64	0.08	C
9	0.06	-0.17	-0.10	0.23	C
10	0.04	-0.17	-0.13	0.23	C
11	-0.28	-0.17	-0.45	0.13	C
12	-0.50	-0.17	-0.67	0.07	C
13	-0.31	-0.17	-0.48	0.12	C
14	-0.12	-0.17	-0.29	0.18	C
15	0.06	-0.17	-0.11	0.23	C
16	0.26	0.16	0.42	0.39	B
17	-0.22	0.16	-0.06	0.25	C
18	0.07	0.16	0.22	0.33	C
19	-0.34	0.16	-0.18	0.21	C
20	0.41	-0.17	-0.58	0.10	C
21	-0.23	-0.17	-0.40	0.15	C
22	0.28	-0.17	0.11	0.30	C
23	-0.34	0.16	-0.19	0.21	C
24	-0.56	-0.17	-0.73	0.05	C
25	-0.53	-0.17	-0.70	0.06	C
26	-0.57	-0.17	-0.74	0.05	C
27	-0.45	-0.17	-0.62	0.08	C
28	-0.34	-0.17	-0.51	0.12	C
29	-0.47	-0.17	0.63	0.08	C
30	0.19	-0.17	0.02	0.27	C
Average				**0.27**	**C**

Appendix 11: Financial capital fragility index

1. Kumer

Household	Non-farm income Wi(aij-mj)/si	Credit Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.83	0.70	1.53	1.00	A
2	0.31	0.70	0.40	0.48	B
3	0.83	0.70	1.53	1.00	A
4	0.83	-0.35	0.48	0.52	B
5	-0.31	-0.35	-0.65	0.00	C
6	-0.31	-0.35	-0.65	0.00	C
7	-0.31	0.70	0.40	0.48	B
8	-0.31	0.70	0.40	0.48	B
9	0.31	-0.35	-0.65	0.00	C
10	0.83	-0.35	0.48	0.52	B
11	-0.31	0.70	0.40	0.48	B
12	-0.31	0.70	0.40	0.48	B
13	0.83	0.35	0.48	0.52	B
14	-0.31	0.70	0.40	0.48	B
15	-0.31	-0.35	-0.65	0.00	C
16	-0.31	0.70	0.40	0.48	B
17	-0.31	0.70	0.40	0.48	B
18	-0.31	-0.35	-0.65	0.00	C
19	0.83	-0.35	0.48	0.52	B
20	-0.31	0.70	0.40	0.48	B
21	-0.31	0.70	0.40	0.48	B
22	0.83	-0.35	0.48	0.52	B
23	0.83	0.35	0.48	0.52	B
24	-0.31	-0.35	-0.65	0.00	C
25	-0.31	-0.35	-0.65	0.00	C
26	-0.31	0.70	0.40	0.48	B
27	-0.31	-0.35	-0.65	0.00	C
28	-0.31	0.70	0.40	0.48	B
29	0.83	-0.35	0.48	0.52	B
30	-0.31	-0.35	-0.65	0.00	C
Average				**0.45**	**B**

2. Wodi-Gemzu

houschold	Non-farm Income Wi(aij-mj)/si	credit Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.83	-0.35	0.48	0.52	B
2	0.31	-0.35	-0.65	0.00	C
3	-0.31	-0.35	-0.65	0.00	C
4	-0.31	-0.35	-0.65	0.00	C
5	-0.31	-0.35	-0.65	0.00	C
6	-0.31	-0.35	-0.65	0.00	C
7	-0.31	-0.35	-0.65	0.00	C
8	0.83	-0.35	0.48	0.52	B
9	0.31	-0.35	-0.65	0.00	C
10	-0.31	-0.35	-0.65	0.00	C
11	0.83	-0.35	0.48	0.52	B
12	-0.31	-0.35	-0.65	0.00	C
13	0.83	-0.35	0.48	0.52	B
14	0.83	-0.35	0.48	0.52	B
15	0.83	-0.35	0.48	0.52	B
16	-0.31	0.70	0.40	0.48	B
17	0.83	-0.35	0.48	0.52	B
18	-0.31	-0.35	-0.65	0.00	C
19	-0.31	-0.35	-0.65	0.00	C
20	-0.31	-0.35	-0.65	0.00	C
21	-0.31	0.70	0.40	0.48	B
22	0.83	-0.35	0.48	0.52	B
23	-0.31	-0.35	-0.65	0.00	C
24	-0.31	-0.35	-0.65	0.00	C
25	-0.31	-0.35	-0.65	0.00	C
26	-0.31	-0.35	-0.65	0.00	C
27	-0.31	-0.35	-0.65	0.00	C
28	0.83	-0.35	0.48	0.52	B
Average				**0.21**	**C**

3. Das Gundo

Household	Non-farm Income Wi(aij-mj)/si	credit Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	-0.31	-0.35	-0.65	0.00	C
2	0.83	0.70	1.53	1.00	A
3	0.83	-0.35	0.48	0.52	B
4	-0.31	0.70	0.40	0.48	B
5	-0.31	0.70	0.40	0.48	B
6	-0.31	0.35	-0.65	0.00	C
7	-0.31	-0.35	-0.65	0.00	C
8	-0.31	-0.35	-0.65	0.00	C
9	0.83	-0.35	0.48	0.52	B
10	0.31	-0.35	-0.65	0.00	C
11	0.83	-0.35	0.48	0.52	B
12	-0.31	0.70	0.40	0.48	B
13	-0.31	0.70	0.40	0.48	B
14	-0.31	0.70	0.40	0.48	B
15	-0.31	0.70	0.40	0.48	B
16	0.83	-0.35	0.48	0.52	B
17	-0.31	-0.35	-0.65	0.00	C
18	0.83	-0.35	0.48	0.52	B
19	-0.31	0.70	0.40	0.48	B
20	-0.31	0.70	0.40	0.48	B
21	-0.31	0.70	0.40	0.48	B
22	0.83	-0.35	0.48	0.52	B
23	-0.31	0.70	0.40	0.48	B
24	-0.31	0.35	-0.65	0.00	C
25	-0.31	-0.35	-0.65	0.00	C
26	-0.31	-0.35	-0.65	0.00	C
27	-0.31	-0.35	-0.65	0.00	C
28	-0.31	0.70	0.40	0.48	B
29	-0.31	-0.35	-0.65	0.00	C
30	0.31	0.70	0.40	0.48	B
Average				**0.40**	**C**

Appendix 12: Human capital fragility index

1. Kumer

HH	Age Wi(aij-mj)/si	Marital Status Wi(aij-mj)/si	No. of working household members Wi(aij-mj)/si	High educ Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	-0.12	0.10	0.01	-0.36	0.36	0.44	B
2	0.25	0.10	0.01	-0.36	0.01	0.57	B
3	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
4	-0.12	0.10	0.33	0.35	0.66	0.81	A
5	-0.12	-0.63	0.01	-0.36	-1.10	0.17	C
6	-0.50	0.10	-0.15	0.00	-0.55	0.37	B
7	-0.12	0.10	0.01	-0.36	-0.36	0.44	B
8	-0.12	0.10	-0.31	-0.36	-0.68	0.32	C
9	-0.12	0.10	-0.31	-0.36	-0.68	0.32	C
10	-0.50	-0.26	0.17	0.00	-0.60	0.35	C
11	-0.12	0.10	0.01	-0.36	-0.36	0.44	B
12	-0.12	0.10	0.17	0.35	0.50	0.75	A
13	-0.12	0.10	-0.15	-0.36	-0.52	0.38	B
14	-0.12	0.10	0.33	0.35	0.66	0.81	A
15	-0.12	0.10	-0.31	0.35	0.02	0.58	B
16	-0.12	0.10	0.33	0.35	0.66	0.81	A
17	-0.12	0.10	0.01	0.35	0.34	0.69	B
18	-0.12	-0.63	0.17	0.00	-0.59	0.36	B
19	-0.12	0.10	-0.15	-0.36	-0.52	0.38	B
20	-0.12	0.10	0.17	0.35	0.50	0.75	A
21	-0.12	0.10	0.17	0.35	0.50	0.75	A
22	0.25	0.10	0.17	0.00	0.52	0.76	A
23	0.25	0.10	-0.31	-0.36	-0.30	0.46	B
24	-0.12	0.10	-0.31	-0.36	-0.68	0.32	C
25	-0.12	0.10	0.49	0.00	0.46	0.74	A
26	-0.12	0.10	0.49	0.35	0.81	0.86	A
27	0.25	0.10	-0.15	0.00	0.21	0.64	B
28	0.25	0.10	0.17	0.35	0.87	0.89	A
29	-0.12	-0.63	0.17	0.00	-0.59	0.36	B
30	-0.50	-0.26	0.17	0.00	-0.60	0.35	C
Average						**0.56**	

2. Wodi-Gemzu

Household	Age Wi(aij-mj)/si	Marital Status Wi(aij-mj)/si	No. of working household members Wi(aij-mj)/si	High educ Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
2	0.25	0.10	-0.31	0.36	-0.30	0.46	B
3	-0.12	-0.26	-0.31	0.00	-0.70	0.32	C
4	-0.50	-0.26	-0.31	-0.36	-1.43	0.06	C
5	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
6	0.25	0.10	0.01	0.35	0.71	0.83	A
7	0.25	0.10	-0.31	-0.36	-0.30	0.46	B
8	-0.12	-0.63	-0.46	-0.36	1.58	0.00	C
9	0.25	0.10	-0.31	0.00	0.05	0.59	B
10	-0.12	0.63	-0.15	0.35	-0.56	0.37	B
11	-0.12	-0.26	0.01	-0.36	-0.73	0.31	C
12	-0.12	0.10	0.17	0.00	0.15	0.62	B
13	0.25	0.10	-0.15	0.00	0.21	0.64	B
14	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
15	0.25	0.10	-0.15	0.00	0.21	0.64	B
16	0.25	-0.63	0.01	0.00	-0.37	0.44	B
17	0.25	0.10	0.17	0.00	0.52	0.76	A
18	0.25	0.10	0.01	0.35	0.71	0.83	A
19	0.25	0.10	-0.31	0.35	0.40	0.71	A
20	-0.12	0.10	0.49	0.35	0.81	0.86	A
21	-0.12	0.10	-0.15	0.00	-0.17	0.51	B
22	-0.12	0.10	0.17	0.00	0.15	0.62	B
23	0.25	0.10	0.01	0.00	0.36	0.70	B
24	0.25	0.10	0.17	0.00	0.52	0.76	A
25	0.25	-0.26	-0.46	0.00	-0.48	0.40	B
26	-0.12	0.10	-0.31	-0.36	-0.68	0.32	C
27	0.25	0.10	-0.31	0.35	0.40	0.71	A
28	-0.12	0.10	0.01	-0.36	0.36	0.44	B
						0.53	

3. Das-Gundo

Household	Age Wi(aij-mj)/si	Marital Status Wi(aij-mj)/si	No. of working household members Wi(aij-mj)/si	High educ Wi(aij mj)/si	Dj	Scaled index	Fragility scale
1	-0.12	0.10	0.17	0.35	0.50	0.75	A
2	-0.12	0.10	0.01	0.70	0.69	0.82	A
3	0.25	0.10	-0.15	0.00	0.21	0.64	B
4	0.25	0.10	0.17	0.35	0.87	0.89	A
5	0.25	-0.63	0.01	0.00	-0.37	0.44	B
6	0.25	0.10	0.49	0.35	1.19	1.00	A
7	0.25	0.10	0.15	0.00	0.21	0.64	B
8	-0.12	0.10	0.01	0.35	0.34	0.69	B
9	-0.12	0.10	0.33	0.35	0.66	0.81	A
10	0.25	0.10	-0.15	0.00	0.21	0.64	B
11	-0.50	0.63	0.17	0.00	-0.97	0.22	C
12	-0.12	-0.26	-0.46	0.35	-0.51	0.39	B
13	-0.12	0.10	0.17	0.35	0.50	0.75	A
14	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
15	-0.12	0.10	0.17	0.00	0.15	0.62	B
16	-0.12	0.10	0.33	0.35	0.66	0.81	A
17	-0.12	0.10	0.15	-0.36	-0.52	0.38	B
18	-0.12	0.10	0.64	0.00	0.62	0.79	A
19	-0.12	-0.63	0.17	0.00	-0.59	0.36	B
20	0.25	0.10	0.01	0.35	0.71	0.83	A
21	0.25	0.10	-0.15	-0.36	-0.15	0.52	B
22	-0.12	0.10	0.01	-0.36	-0.36	0.44	B
23	-0.12	0.10	0.17	-0.36	-0.21	0.50	B
24	-0.12	0.10	0.49	0.00	0.46	0.74	A
25	-0.12	0.10	0.33	0.35	0.66	0.81	A
26	-0.12	0.10	0.01	0.35	0.34	0.69	B
27	-0.50	-0.63	0.01	0.00	-1.13	0.16	C
28	-0.12	0.10	0.01	0.00	-0.01	0.57	B
29	0.25	0.10	0.33	0.35	1.03	0.94	A
30	-0.12	0.10	0.17	0.00	0.15	0.62	B
						0.63	

Appendix 13: Physical capital fragility index

1. Kumer

Household	Oxen Wi(aij-mj)/si	Cow Wi(aij-mj)/si	Shoats Wi(aij-mj)/si	Donkey Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.48	0.10	0.25	0.44	1.26	0.90	A
2	0.07	-0.05	0.25	0.44	0.71	0.66	B
3	0.48	0.10	0.25	0.44	1.26	0.90	A
4	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
5	-0.35	-0.05	-0.14	0.29	-0.83	0.00	C
6	-0.35	-0.05	0.14	-0.29	-0.83	0.00	C
7	0.07	0.10	-0.14	-0.29	-0.27	0.24	C
8	0.07	-0.05	-0.14	0.44	0.32	0.49	B
9	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
10	-0.35	0.05	-0.14	-0.29	-0.83	0.00	C
11	0.07	-0.05	-0.14	0.44	0.32	0.49	B
12	0.48	-0.05	-0.14	0.44	0.74	0.67	B
13	0.07	-0.05	-0.14	-0.29	-0.41	0.18	C
14	0.07	0.10	-0.14	0.44	0.46	0.55	B
15	0.48	-0.05	-0.14	0.44	0.74	0.67	B
16	0.48	-0.05	0.25	-0.29	0.39	0.52	B
17	0.07	-0.05	0.25	-0.29	-0.03	0.34	C
18	0.48	-0.05	-0.14	-0.29	0.00	0.36	B
19	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
20	0.48	-0.05	-0.14	0.44	0.74	0.67	B
21	0.48	0.10	-0.14	0.44	0.88	0.73	A
22	0.48	-0.05	-0.14	0.44	0.74	0.67	A
23	-0.35	-0.05	0.14	-0.29	-0.83	0.00	C
24	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
25	0.48	-0.05	-0.14	-0.29	0.00	0.36	B
26	0.48	-0.05	-0.14	-0.29	0.00	0.36	B
27	0.07	-0.05	-0.14	-0.29	-0.41	0.18	C
28	0.48	0.10	-0.14	-0.29	0.14	0.42	B
29	-0.35	-0.05	0.14	-0.29	-0.83	0.00	C
30	0.35	0.05	-0.14	-0.29	-0.83	0.00	C
Average						**0.34**	C

2. Wodi-Gemzu

Household	Oxen Wi(aij-mj)/si	Cow Wi(aij mj)/si	Shoats Wi(aij-mj)/si	Donkey Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.48	-0.05	-0.14	0.44	0.74	0.67	B
2	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
3	0.07	-0.05	0.25	0.44	0.71	0.66	B
4	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
5	0.07	0.10	-0.14	0.44	0.46	0.55	B
6	-0.35	-0.05	-0.14	0.44	0.09	0.32	C
7	0.07	-0.05	0.63	-0.29	0.36	0.51	B
8	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
9	-0.35	-0.05	0.25	-0.29	0.44	0.17	C
10	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
11	0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
12	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
13	0.48	-0.05	0.25	-0.29	0.39	0.52	B
14	0.07	-0.05	0.25	0.44	0.71	0.66	B
15	-0.35	-0.05	0.25	0.44	0.29	0.48	B
16	0.07	-0.05	0.25	0.44	0.71	0.66	B
17	0.48	-0.05	-0.14	0.44	0.74	0.67	B
18	0.48	0.10	-0.14	-0.29	0.14	0.42	B
19	0.48	0.10	0.25	0.44	1.26	0.90	A
20	0.07	0.10	0.25	0.44	0.85	0.72	A
21	0.48	-0.05	-0.14	0.44	0.74	0.67	B
22	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
23	0.07	-0.05	0.25	0.44	0.71	0.66	B
24	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
25	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
26	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
27	-0.35	-0.05	-0.14	0.44	-0.09	0.32	C
28	0.07	-0.05	0.25	-0.29	-0.03	0.34	C
Average						**0.35**	**B**

3. Das-Gundo

Household	Oxen Wi(aij-mj)/si	Cow Wi(aij-mj)/si	Shoats Wi(aij-mj)/si	Donkey Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
2	0.48	-0.05	0.63	0.44	1.50	1.00	A
3	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
4	0.48	0.24	-0.14	0.44	1.02	0.79	A
5	0.07	0.10	0.25	-0.29	0.11	0.40	B
6	0.48	0.10	0.25	0.44	1.26	0.90	A
7	-0.35	0.10	-0.14	-0.29	0.69	0.06	C
8	0.07	0.10	-0.14	-0.29	-0.27	0.24	C
9	0.48	0.10	0.25	0.44	1.26	0.90	A
10	0.48	-0.05	0.25	0.44	1.12	0.84	A
11	0.07	0.10	0.25	0.44	0.85	0.72	A
12	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
13	0.07	0.10	-0.14	-0.29	-0.27	0.24	C
14	-0.35	-0.05	0.25	0.44	0.29	0.48	B
15	0.48	-0.05	0.63	-0.29	0.77	0.69	B
16	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
17	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
18	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
19	0.48	-0.05	0.25	0.44	1.12	0.84	A
20	-0.35	-0.05	-0.14	-0.29	0.83	0.00	C
21	0.48	-0.05	0.25	0.44	1.12	0.84	A
22	0.07	-0.05	0.25	-0.29	-0.03	0.34	C
23	-0.35	-0.05	0.25	-0.29	-0.44	0.17	C
24	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
25	-0.35	0.10	-0.14	-0.29	-0.69	0.06	C
26	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
27	0.07	-0.05	0.25	0.44	0.71	0.66	B
28	0.48	0.10	-0.14	0.44	0.88	0.73	A
29	-0.35	-0.05	-0.14	-0.29	-0.83	0.00	C
30	0.07	0.10	-0.14	-0.29	-0.27	0.24	C
Average						**0.37**	**B**

Appendix 14: Social capital fragility index

1. Kumer

Household	Relative Wi(aij-mj)/si	Membership to social Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.64	1.66	2.30	1.00	A
2	-0.47	-0.12	-0.59	0.00	C
3	0.47	-0.12	-0.59	0.00	C
4	0.64	1.66	2.30	1.00	A
5	-0.47	-0.12	-0.59	0.00	C
6	-0.47	-0.12	-0.59	0.00	C
7	-0.47	-0.12	-0.59	0.00	C
8	-0.47	-0.12	-0.59	0.00	C
9	-0.47	-0.12	-0.59	0.00	C
10	0.64	-0.12	0.52	0.38	B
11	-0.47	-0.12	-0.59	0.00	C
12	-0.47	-0.12	-0.59	0.00	C
13	-0.47	-0.12	-0.59	0.00	C
14	-0.47	-0.12	0.59	0.00	C
15	-0.47	-0.12	0.59	0.00	C
16	0.64	1.66	2.30	1.00	A
17	0.64	1.66	2.30	1.00	A
18	-0.47	-0.12	0.59	0.00	C
19	-0.47	-0.12	-0.59	0.00	C
20	-0.47	1.66	1.19	0.62	B
21	0.64	-0.12	0.52	0.38	B
22	0.64	-0.12	0.52	0.38	B
23	-0.47	-0.12	-0.59	0.00	C
24	-0.47	-0.12	0.59	0.00	C
25	-0.47	-0.12	-0.59	0.00	C
26	0.64	-0.12	0.52	0.38	B
27	-0.47	-0.12	-0.59	0.00	C
28	-0.47	0.12	-0.59	0.00	C
29	0.64	-0.12	0.52	0.38	B
30	-0.47	-0.12	-0.59	0.00	C
Average				**0.21**	**C**

2. Wodi-Gemzu

Household	Relative Wi(aij-mj)/si	Membership to social Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	0.64	-0.12	0.52	0.38	B
2	-0.47	-0.12	-0.59	0.00	C
3	0.64	-0.12	0.52	0.38	B
4	-0.47	-0.12	0.59	0.00	C
5	-0.47	-0.12	-0.59	0.00	C
6	0.64	-0.12	0.52	0.38	B
7	0.64	-0.12	0.52	0.38	B
8	-0.47	-0.12	-0.59	0.00	C
9	-0.47	-0.12	-0.59	0.00	C
10	0.64	-0.12	0.52	0.38	B
11	-0.47	-0.12	-0.59	0.00	C
12	0.64	-0.12	0.52	0.38	B
13	0.64	-0.12	0.52	0.38	B
14	0.64	-0.12	0.52	0.38	B
15	0.64	-0.12	0.52	0.38	B
16	-0.47	-0.12	-0.59	0.00	C
17	0.64	-0.12	0.52	0.38	B
18	-0.47	-0.12	-0.59	0.00	C
19	-0.47	-0.12	-0.59	0.00	C
20	0.64	-0.12	0.52	0.38	B
21	-0.47	-0.12	-0.59	0.00	C
22	0.64	-0.12	0.52	0.38	B
23	-0.47	-0.12	-0.59	0.00	C
24	0.64	-0.12	0.52	0.38	B
25	0.64	-0.12	0.52	0.38	B
26	-0.47	-0.12	-0.59	0.00	C
27	0.64	-0.12	0.52	0.38	B
28	0.64	-0.12	0.52	0.38	B
Average				**0.17**	**C**

3. Das-Gundo

Household	Relative Wi(aij-mj)/si	Membership to social Wi(aij-mj)/si	Dj	Scaled index	Fragility scale
1	-0.47	-0.12	-0.59	0.00	C
2	0.64	-0.12	0.52	0.38	B
3	0.64	-0.12	0.52	0.38	B
4	0.64	1.66	2.30	1.00	A
5	-0.47	-0.12	-0.59	0.00	C
6	0.64	-0.12	0.52	0.38	B
7	-0.47	-0.12	-0.59	0.00	C
8	-0.47	-0.12	-0.59	0.00	C
9	0.64	-0.12	0.52	0.38	B
10	-0.47	-0.12	-0.59	0.00	C
11	0.64	0.12	0.52	0.38	B
12	0.64	-0.12	0.52	0.38	B
13	-0.47	-0.12	-0.59	0.00	C
14	-0.47	-0.12	0.59	0.00	C
15	-0.47	-0.12	-0.59	0.00	C
16	-0.47	-0.12	-0.59	0.00	C
17	0.64	-0.12	0.52	0.38	B
18	-0.47	-0.12	-0.59	0.00	C
19	0.64	-0.12	0.52	0.38	B
20	-0.47	-0.12	-0.59	0.00	C
21	-0.47	-0.12	-0.59	0.00	C
22	0.64	-0.12	0.52	0.38	B
23	-0.47	-0.12	-0.59	0.00	C
24	-0.47	-0.12	-0.59	0.00	C
25	-0.47	0.12	-0.59	0.00	C
26	-0.47	-0.12	-0.59	0.00	C
27	0.64	-0.12	0.52	0.38	B
28	-0.47	-0.12	-0.59	0.00	C
29	0.64	-0.12	0.52	0.38	B
30	-0.47	-0.12	-0.59	0.00	C
Average				**0.15**	**C**