

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**Rural Livelihood Strategies and Household Food Security: The Case
of Farmers Around Derba Cement Factory, Sululta Woreda,
Oromia Regional State**

By:

Dereje Tesema Regasa

June 2016

Addis Ababa, Ethiopia

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Dereje Tesema Regasa

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Advisor: Abeje Berhanu (PhD)

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This is to certify that the thesis prepared by Dereje Tesema Regasa, entitled: *Rural Livelihood Strategies and Household Food Security: The Case of Farmers Around Derba Cement Factory, Sululta Woreda, Oromia Regional State* and submitted in partial fulfillment of the requirements for the degree of Master of Arts in Sociology complies with the regulation of the University and meets the accepted standards with respect to originality and quality.

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Advisor	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

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Glossary of local terms

Areke a local alcoholic drink that is mainly prepared by women

Equb a form of traditional association where members are organized in pursuit of saving money and get a saved cash based on draw.

Kebeleland a land which is mostly found around the hill sides, presumed to be managed by the kebele administration, but communally used by the local community.

Humna is a local traditional livestock sharing arrangement whereby farmers who need ox share it with other people. It involves an agreement by which the farmer who takes the ox of other for certain production year pay back grains in return for the person who give ox.

Mesob a hand woven round material which is made from grass and used to keep food.

Lemet is like mesob but it is used during feed like any other factory-produced dishes

Abbreviations

ACF	Action Contre La Faim
ADLI	Agricultural Development Led Industrialization
AGRA	Alliance for Green Revolution in Africa
CSA	Central Statistical Agency
DFID	Department for International Development of United Kingdom
DMC	Derba Midroc Cement
EEA	Ethiopian Economic Association
ETB	Ethiopian Birr
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
GDP	Gross Domestic Product
HFIAS	Household Food Insecurity Access Scale
HH	Household
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
MoFED	Ministry of Finance and Economic Development
MLR	Multinomial Logistic Regression
OSCI	Oromia Saving and Credit Institution
RPR	Rural Poverty Report
SSA	Sub-Saharan Africa
SWARDO	Sululta Woreda Agricultural and Rural Development Office
TLU	Tropical Livestock Unit
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNDP	United Nations Development Program
WFP	World Food Program

Abstract

This study examined the livelihood strategies and food security situation in Sululta woreda by taking a randomly selected sample of 215 households from three rural kebeles. Mixed research approach was employed and triangulation was vital method of converging concurrently collected data through survey, interviews and FGDs. Descriptive statistics were used to describe livelihood strategies while multinomial logistic regression was deployed to explain the determinants of livelihood strategies and the linkage between livelihood strategies and household food security.

Mixed farming is typical of agricultural livelihood of the study households. Though majority of the households were confined to agricultural livelihood, the widespread of non-farm activities was observed. More than half of sample households undertake non-farm livelihood activities either as a supplementary or as a main means of living. The distribution of livelihood strategies was not even across the three agro-ecological conditions selected. Highland kebeles were more likely to intensify agriculture than the lowland which operate more non-farm livelihood and depend on forest products. The result of multinomial regression showed that land holding, livestock, educational attainment, markets access, gender, and household composition determine the choice of livelihood strategies. It also revealed the pushing reasons of diversification among households.

The effect of climatic vagaries on farmers' livelihood was complemented by cement investment that encroached on resources of rural people. The majority of households reported their experience of chronic food access insecurity. Relatively, those respondents who engaged in agricultural and non-farm activities were more food secure than those confined to agriculture or non-farm. Sample households with multiple livelihood strategies had diverse food entitlements to support their sustainable consumption. This calls for inclusive policies and strategies that advocate rural non-farm activities which supplement agriculture in pursuit of ensuring household food security in rural areas.

Chapter One: Introduction

1.1. Background of the Study

Livelihood strategies pursued by rural households are at the heart of examining their food security (Oni and Fashogbon 2012; DFID 2004; IFPRI 2015). Food security is an outcome closely linked to viable livelihood strategies (Matshe 2009; Gathiaka and Muriithi 2013). Therefore, food security needs to be analyzed within the broader spectrum of the livelihood of the study population (Maxwell and Smith 1992:4). Despite concerted efforts, food insecurity remains unabated bottleneck to human society in developing countries (Sasson 2012).

The majority of world's food insecure are rural smallholder farmers, and inhabit the developing world (UNECA 2013; Hazell 2011; RPR 2011). About 23.8 percent of food insecure people worldwide live in sub-Saharan Africa (SSA) (FAO, WFP, and IFAD 2014). Of this proportion, 80 percent live in rural areas, working as peasants, landless laborers and pastoralists which are often labeled with resource dearth (Rural Poverty Report 2011).

Agriculture is the main livelihood strategy in developing countries. It absorbs a huge rural labor, generates a significant share of GDP and is a crucial sector to address food security (Hazell 2011; Boto 2014). However, agriculture in sub-Saharan Africa is dependent on variable climate. In addition to this, farmers in Africa live on small hectare of farmland. Decimation of farm size accelerates and hence thwarts efforts to increase farm productivity. Therefore, in line with augmenting agricultural productivity, looking for other way out has been put forward as an equally potent strategy for addressing household food security (Stifel 2010; Asmah 2011; Maharjan 2014).

Ellis (2000) and UNECA (2013) recognized that agriculture on its own could not provide sound means of escaping food insecurity for the rural poor. This necessitates policies that inform diversification away from natural resource dependent living as a process of spreading risk against

potential livelihood collapse (Ellis 1999; Matshe 2009; Rahut et al. 2014). On average, non-farm income contributes to 35 percent of the total rural income in SSA (Haggblade et al. 2010). Researchers indicate a positive association between nonfarm livelihood activity, household welfare and consumption smoothing; but there are no uniform distributions (Barret et al. 200; Stifel 2010).

There are two views on why rural households widen livelihood options other than agriculture (Loison 2015). Some asserts the development of non-farm activities as natural progression from a predominantly agrarian economy into a diversified economy for better living (pull factors). In contrast, Ellis and Freeman (2005), attribute the signs to a distressed agricultural sector that is losing its resources, not as a result of agricultural growth triggering growth in other sectors of the economy. In Sub-Saharan Africa widening means of living is viewed as a response to the failure of agriculture to provide a sufficient livelihood for a substantial proportion of rural dwellers (Devereux 2000; EEA 2009; Ellis and Allison 2004; Maharjan 2014). Yet, with rising population and prevailing hunger, agriculture remains a vital option of living in SSA (AGRA 2015).

Ethiopia is one of the agrarian countries where 84 percent of its total population lives in rural areas, of which 90 percent depend mainly on crop production for its livelihood. Smallholder farming dominates its production (CSA 2011; Zegeye and Hussein 2011). Agriculture contributes 45% of GDP, more than 80% employment opportunities and over 90% of the foreign exchange earnings of the country (EEA 2009; Yishak et al. 2014; MoA 2010; Yenesew et la. 2015).

Nonetheless, Ethiopian agriculture is less productive even by the SSA standard. Thus, the nation has large population of poor and food insecure of which the largest group is rural people with insufficient assets to produce and purchase food (Devereux 2000; Getahun 2003; Shumet 2009). Food insecurity is evident even in non-drought years and in surplus producing areas (Legesse and Chala 2005). About 10 percent of Ethiopian population is chronically food insecure (Birara et al. 2015:55).

Ethiopian Food Security Strategy (1996) identified landless, ox-less, female headed, elderly, poor nonagricultural households and new established settlers as food insecure. Their chronic food insecurity is mainly attributed to low return livelihood system (Masefield 2001). While efforts to ensure adequate food supplies at the national level have done well, these paths on their own fail to ensure food security for households and individuals (MoFED 2012; Birara et al. 2015). Policies thus need to promote access to assets and alternative livelihoods (EEA 2009; Mesfin 2014).

This study was conducted in rural areas of Sululta Woreda, Oromia Regional State. Specific study populations were rural households surrounding Derba cement factory. Livelihood strategies, factors underpinning livelihood activities and the implication of livelihood strategies of households on their food security were the main focal areas of the study.

1.2. Statement of the problem

Rural households in African countries are resource poor and hence lead vulnerable livelihoods (Devereux 2000; Ellis and Freeman 2005; AGRA 2014:15). Limited access to crucial assets such as ecologically friendly technologies, credit, (fertile) land and finance force smallholder farmers to select low return strategies. Entry to more rewarding farm and non-farm livelihood activities is stringent due to such a tight resource access (Murphy 2012; Barrett et al. 2005; Stifel 2010).

Households under such constraints, in rural Ethiopia, are people for whom farming is a major livelihood activity, yet who have insufficient assets to produce a surplus from their agricultural activities. For other rural households, non-farm activities are inadequately reliable or remunerative to rely on market purchases for adequate food intake (Shumete 2009; Matshe 2009; Tsegaye 2012).

For livelihood perspective, food security is the result of access to livelihood activities that allow people to live (Patel et al. 2015; Oni and Fashogbon 2012). Thus, treating household food security

without due consideration of the security of the livelihood of the unit of analysis in question is inadequate in making feasible policy recommendations (Devereux et al. 2004; DFID 2004; Burchi and Muro 2012; Matshe 2009:486).

Nonetheless, few attempts have been made to link rural livelihood in a systematic way to outcomes. If any, studies consider the income dimension than outcomes such as food security (Levine 2014). In available literature, the dimension of linkage between livelihood strategies and household food security is inconclusive. While some results inform improved food security situation due to alternative livelihoods added to agriculture, others revealed dwindling situation of household food security besides spreading livelihood strategies (Mensah 2014; Loison 2015).

Similarly, in Ethiopia studies on the outcome of livelihood strategies are of mixed results. Some consider the spread of rural livelihood as a best prospect of improving household food security. Others treat the effort as mere survival strategies (Gesese and Ignatious 2012). These arguments are informed by two debating perspectives: de-agrarianisation and sustainable rural livelihood. The former argues the adoption of non-farm activities as a process of eroding agrarian way of life. Farmers thus strive to secure cash outside farming in order to secure food (Bryceson 1999; 2002). On the other hand, sustainable livelihood emphasizes the contribution of farm, and non-farm livelihood strategies in the households' efforts to secure food (Saha and Bahal 2010).

Numerous researches have been conducted on determinants of food security (Messay 2009, Degye 2013; Fikadu and Mequanent 2010; Jemal and Kim 2014). Invariably these studies examined specific households assets against nutrition security rather than how people combine their available resources, make certain livelihoods and maintain their food access. In the same vein, studies on rural livelihood more attune to determinants of livelihood strategies rather than the linkages with food security (Yishak et al. 2014 Carswell 2002; Yinesw et al. 2015; Amare and Belayineh 2013).

Adugna (2008) studied the livelihood strategies and food security situations in Southern Ethiopia. Like nutritional science, this study adopted the national nutritional threshold; 2200 kilocalories /adult/day to identify food security situation than household specific experience of food access; as a result, it overlooks variations among households' access. The point is *what if the standard calories are attained in extreme worry and uncertainty about lacking food, are such households food secure?*

A study by Arega, Woldeamlak, and Nicolau (2013) examined the livelihood activities and food security outcomes in the drought-prone areas of Amhara Region. They found low productivity and drought vulnerable nature of livelihood that resulted in chronic food insecurity. Despite stating this, the study used no indicators of food security rather employed annual income outcome of livelihood as an indicator of food security. The study at hand will not employ income approach, as it is the *indirect measure of food security*. Access based approach that embraces the direct household level experience on producing, purchasing, adequacy and uncertainty about food was used in this study.

Succinctly, the study at hand contributes to the existing body of knowledge on three main grounds. First, it reveals the linkage between livelihood strategies and food security. Second, the study articulates the social aspect of food security, food access, which is not articulated more by previous studies. Therefore, issues beyond nutritional approach to food security like affordability, stability, physical access, worry of food shortage were addressed using validated instrument. Finally, the study comes up with location specific challenges facing agrarian livelihoods.

In *Sululta Woreda*, farm households' resources (mainly land) are constantly changing. This is evident with the introduction of mining investments which affected livelihood activities of the local people. Yet, scientific investigation on livelihood and food security situation of the rural households in such a changing environment has not been done. Against this backdrop, this study focuses the livelihood strategies, drivers of livelihoods, challenges farmers are facing in pursuing their

livelihood strategies on the path of maintaining their household food security using mixed research approach.

1.3. Objectives of the study

The main objective of this study is to examine the livelihood strategies and household food security situation of rural households in *Sululta Woreda*. In line with this, the following specific objectives are formulated. These are:

- To describe the livelihood strategies of rural households of the study area
- To identify the determinants of livelihood strategies of the rural households in the area
- To explore the challenges facing the livelihoods smallholder farmers
- To examine the impact of livelihood activities on household food security situation

1.4. Delimitation of the study

The central theme of this investigation is examining the livelihood strategies and household food security. Issues related to this topic are multifaceted. However, this investigation concentrates on describing the livelihood strategies pursued by household, their determinants and implication for food security situations. It is guided by sustainable livelihood framework. Therefore, intricate factors, beyond livelihood framework, determining food security were not the focus of this study.

Apprehending all dimensions of food security is another tricky issue. For this inquiry, household food access is stressed. In other words, food security assessments related to nutrition security and measurements of food intakes are beyond the scope of this thesis. Instead, livelihood approach was employed to assess the underlying drivers of household's ability to combine their existing resources in pursuing certain livelihood activities to feed themselves. The study focused on *Sululta Woreda*.

1.5. Significance of the study

This study identifies the food security of different livelihood groups. Academically, the study contributes to literatures employing livelihood lens in studying subjective food security conditions than treating food security from aggregate national profile. Moreover, it broadens the orientation of existing reviews on rural livelihood strategies beyond agriculture since rural non-farm enterprises are growing. The findings of this thesis are believed to instigate further researches on development of rural employment, viability of farming and coping strategies of different groups.

Results of this investigation also inform poverty reduction policies to consider the variation in livelihood activities of rural people. It also gives insight in thriving potential livelihood strategies with different risk factors besides nurturing agricultural livelihood. This in turn urges interventions to be planned in mitigating pervasive livelihood collapse. In the study area, where non-farm investments were expanding, the study provides roadmap for local government bodies to ensure win-win situation between agricultural and non-agricultural sectors. It also indicates opportunities to establish forward and backward linkages between sectors to maximize the returns of activities.

1.6. Organization of the thesis

Contents of this thesis are organized into seven chapters. The first chapter introduces the main theme of the inquiry along with its justification and pillar objectives. The second chapter addresses literature substantiating the topic of the thesis. Chapter three presents approaches and methods underpinning the study. Major findings of the study were discussed in three chapters following research methods. The final chapter summarizes and set implications of the major findings of the study.

Chapter Two: Conceptual, Theoretical and Empirical Literature

2.1. Conceptual Literature

This section discusses core concepts used in the study, including livelihood, livelihood strategies, food (in) security, and dimensions of food security.

2.1.1. Livelihood

Livelihood is a generic term that involves several components (De Haan 2012). Thus, there is no universally endorsed definition to grasp the term livelihood (Scoones 2009). The most widely used definition of livelihood is the one offered by Chambers and Conway built on participatory research practices of World Commission on Environment and Development:

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 (Chambers and Conway 1991:6)

Vital components of this definition are assets, capabilities and activities required for means of living. Assets are resources that households combine in order to choose between available options of living for positive outcomes (Krantz 2001:1). For livelihood perspective, these resources involve natural, social, financial, human, and physical capitals each having different elements. Following the above definition, Carney (1998), acknowledges the notion of claims and access that enable households to combine their resources at disposal under wider structures and institutions to make livelihood.

For Bebbington (1999:2022), resources not only shape livelihood strategies but also bake capabilities to act and to confront the social conditions that produce poverty. They are also the basis of an agent's power to act and to reproduce, challenge or change the rules that govern the control, use and transformation of resources. Capabilities are functions of peoples' initial endowments of

different types of capital assets that further strengthen the ability of people to undertake activities for cherished goal (Ellis 2000). For rural households, the ability to produce and feed its members relies on being able to farm or acquire from other sources which in turn depends on the possession of assets like skills, farmland, finance, market, and social networks.

2.1.2. Food Security: Concept, Evolution and Dimensions

Food security becomes an important organizing principle in development which has called for academic literature, aid agencies, national and local programmes, mainly in sub-Saharan Africa (Maxwell and Smith 1992:6). The emergence and surge of the concept of food security is traced back to the 1970s food crisis. Subsequently, the concept of food security has evolved and tends to comprise different elements across time and space (Young et al. 2001; Pieters et al. 2012).

Smith et al. (1993) canvassed over 180 articles on food security from 1986-1991 and revealed the predominance of food security studies at the national and international levels than household food security. Household food security is relatively new arena in 1980s, relative to the generic concept of food security. An important shift was seen mid-1990s when the attention was drawn to not only at international and national level of food security but also to households and individuals (Paramitta 2013; Molledo et al. 2014).

The World Food Summit first coined the concept of food security in 1974, defining it as, *availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices*. This definition initiated food availability approach, which dictates food security as a function of production. In other words, food insecurity is a result of production failure; the path out of food insecurity can be accelerated through increasing production. This view coincides with Malthusian assumptions of incommensurable population growth rate and production pace all over the world (Burchi and De Muro 2012).

The limitations of such an approach became immediately evident. Disconnection emerged between the success in increasing food supplies through improved agricultural production and the persistence of hunger and malnutrition around the world (Moltedo et al. 2014). It was noted that national level food availability (supply side) is not a guarantee to household level food security for the access to food by all people be a matter of concern (DFID 2004). What is available must be accessed by people (Deitchler et al. 2010). The situation of Ethiopian famine in 1984 attested the shortcoming of the food availability approach (Degefa 2005; Ncube 2014). Therefore, household food insecurity is started to be claimed as the resultant effect of food entitlement decline (FED), due to lack of resources to command food (Gathiaka and Muriithi 2013).

Informed with this, FAO (2009) announced the latest definition of food security which reads: *Food security [is] a situation that 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.* This notion downplayed objective measurements of food insecurity (like calories requirement) due to their definitional ambiguity of what is considered ‘enough’ for an individual (Paramitta 2013).

Three main transitions were observed from the evolution of food security concept. The first is from food availability approach to entitlement approach. The latter acknowledges endowments of households and activities to access food through own production, exchange, and trade (Clover 2003:7; Webb et al. 2006:1405). The second aspect is the unit of analysis (Clover 2003). Units of analysis used in the food availability approach are the country (its food balance sheet) and the agricultural sector (its outputs, productivity). This lacks disaggregation and hence misleads policy intervention (Burchi and De Muro 2012). For food entitlement approach, the units of analysis are individuals as well as households (ACF 2010).

Above all, relevant to this study, is the shift from food first perspective to a livelihood perspective as noted by Patel et al (2015) and Ncube (2014). The conventional view of food security was that food is a primary need whilst the livelihood approach emphasizes the multidimensionality of food insecurity that can be addressed in line with other outcomes. Consequently, measurements of food security shifted from objective to diverse peoples' perceptions (Degefa 2005:9).

2.1.3. Dimensions of Food Security

The working definition of food security of FAO (2009) comprises four core dimensions: availability, access, utilization and stability. Availability addresses the supply side of food security (FAO 2008:1). Oni and Fashogbon (2012) noted that food availability involves the quantity of food the households/ regions/nations have at a point in time. It is a function of local food production, food importation, and food aid, supply factors in food production.

Food access involves the ability of the nation, region, household or individual to gain access to the available food. This is thus predominantly a demand issue in food security. It comprises the economic level of the household to afford the food needed (Benedict 2011). Conferring the Sens' (1981) thesis, Young et al. (2001) claimed that the root cause of food insecurity is the inability of people to gain access to food due to poverty. For instance, farm households with limited farm productivity and low cash face a challenge of acquiring food in time of food shortage though market is with abundance.

Stability of access denotes the ability of the household to have a continuous access to the food source with minimal risks (Worell 2009; Moltedo et. 2014). Finally, utilization is understood as the quality of food that meets the nutritional requirement for the household (Wiggins and Leturque 2010). Thus, quantity of food does not necessarily lead to well-nourished households; there may be malnutrition due to health care and sanitation (Young et al. 2001; ACF 2010:36).

2.1.4. Food Insecurity

Food insecurity is the opposite state of having access to adequate food (Wiggins and Leturque 2010). It occurs either temporarily or persistently (Hussein 2002:2). Chronic food insecurity is a situation in which household runs a continually high risk of inability to meet the food needs of household members due to lack of assets. In contrast, transitory food insecurity occurs when a household faces a temporary decline in the security of its entitlement and the risk of failure to meet food needs (Woller 2009; Degefa 2002).

In rural Ethiopia, the situation is of mixed existence due to nation's structural food deficit nature. Asset poor rural Ethiopians experience all forms of food insecurity. They cannot meet their food needs even under ideal weather conditions. They also suffer from seasonal hunger or famine in years of low or erratic rainfall. Landlessness, smallholding and limited off-farm employment opportunities leave people trapped in increasingly unviable agriculture (Devereux 2000:1).

2.2. Theoretical Literature: The Sustainable Livelihood Approach

This study is guided by sustainable livelihood approach. This is mainly due its eclectic tendency to appraise the resource base of rural households, the way they combine their assets and pursue certain livelihood activities to achieve cherished livelihood outcomes (food security in this study). Sustainable livelihood approach looks beyond sectoral view to address livelihoods of people under consideration (ACF 2010; Morse and McNamara 2013). Moreover, it articulates the way people perform economically, socially and environmentally viable livelihood (Krantz 2001:5).

Livelihoods perspective to rural life found its roots in 'systems' approaches to sectors such as agriculture. At the core of the approach was the recognition of the 'actors' strength in combining what they have at hand in choosing strategies for their sustenance. It works against the notion of

poor people as powerless (Hadju 2006; De Haan 2012). For it is pro poor development tool, it was typically applied in poorer countries as a part of policy planning, project or perhaps as a base for more in-depth research (Morse and McNamara 2013).

Livelihood approach as poverty reduction model became the primary focus of much international development work in the 1990s and 2000s (Scoones 2009). Theoretical roots of the sustainable livelihoods approach shifted from the nation-state orientation of prior community development efforts, which focused on modernization and political control, to advocating for the analysis of the realities of poor and marginalized people from their own perspective (Arce 2003:202).

Sustainable livelihood approach stands on the basic premises that people draw on different livelihood resources under certain contexts. Resources are filtered through structures and processes to be employed in activities of making living. As such, livelihood approach starts with an analysis of people's livelihoods and how these have been changing overtime with basic emphasize on people and impacts of different policies on peoples livelihoods (Farrington et al. 1999; Scoones 1998; Carney 1998; Castalonge 2008; Murray 2001).

Sustainable livelihood approach has four fundamental relevance in explaining rural household food security over previous approaches: food availability, food entitlement and basic needs approach. First, it offers long-term insight to peoples livelihood, second it acknowledges the wider context under which people perform and it give due attention to the resilience of people in maintaining their living. Moreover, it extend beyond narrow focus on agriculture, apprehends non-farm activities in enhancing food security. Finally livelihoods approaches provide a useful input in disaggregating national level data giving rise to enable more sensitive and differentiated policies and interventions (Young et al. 2001; Hussein 2002: 5; Burchi and De Muro 2012:16).

2.2.1. The Sustainable Livelihood Framework and its Components

Livelihood approach to addressing rural poverty is sketched through sustainable livelihood framework which is developed, and adapted by various agencies for different interventions. It presents the main factors that affect people's livelihoods and typical relationships between them (Haidar 2009). The framework emanated from focuses on the underlying interest in food security and new interest in sustainability in peasant studies of 1980's. It is a useful analytical instrument which provides researches an insight to depart from where the people are living and what they are doing to sustain life (Castalonge 2008; Scoones 2009). UNDP, CARE, DFID and OXFAM are among the main agencies which employ livelihood framework (Hussein 2002).

All frameworks base their landmark on the definition of Chambers and Conway (1991) and hence incorporate the fundamental elements of livelihood: assets, capabilities and activities for making living. However, slight difference could be noted on the basis of household endowments and micro-macro level interplay which affects the performance of rural livelihoods. DFID is the most widely used framework for analyzing sustainable rural livelihoods (Bennett 2010).

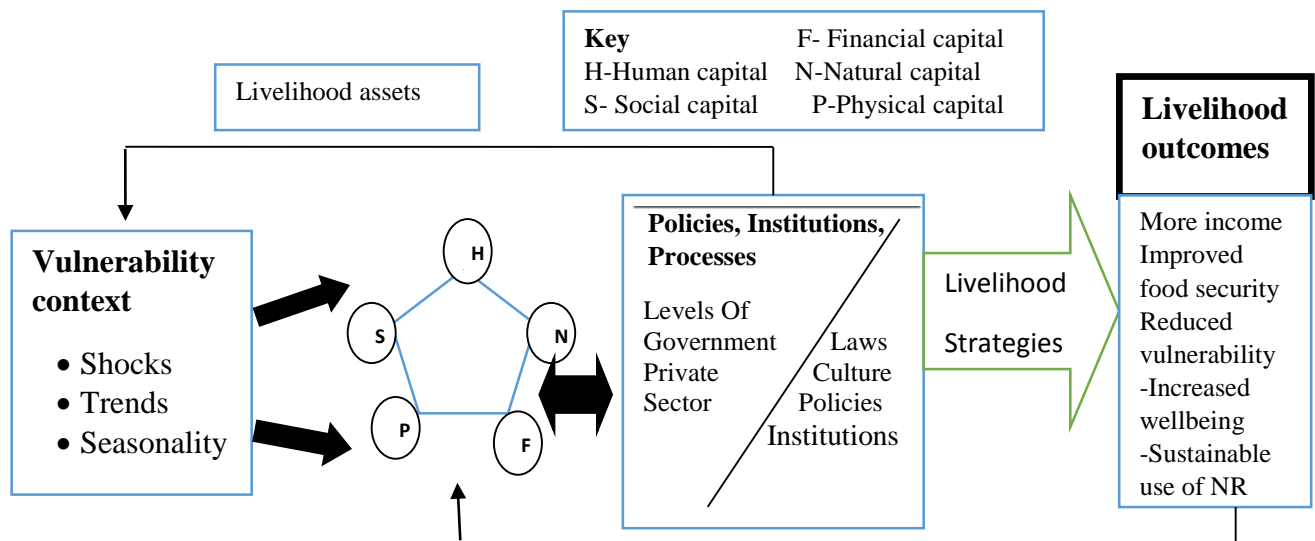


Figure 2.1. Sustainable livelihoods framework (Source: Farrington et al. 1999)

2.2.2. Components of the Sustainable Livelihood Framework

Assets

Central to the framework is a pentagon of livelihood assets or capitals that can be utilized for achieving desirable outcomes, reducing vulnerability of households (Farrington et al. 1999). These are resources, combined by households to make living possible (Hadju 2006). The shape of the pentagon depicts variation in people's access and contribution from different dimension of resources to a livelihood of household (DFID 1999). Analysis of assets in the rural livelihood therefore needs to examine the functions of different asset types held by poor who undertake different livelihood strategies (Dorward et al. 2001; Arce 2003). Different scholars used different connotation of what constitute resources for rural households (Ellis 2000). As drawn from DFID framework, five capitals are identified as the major assets. These are natural, social, human, financial and physical capital.

Natural capital represents capitals from which ecological services flows and resource useful for livelihoods are derived. It includes land, water, wildlife, biodiversity or environmental resources. Physical capital comprises basic infrastructure (transport, shelter, water, energy, and communications), production equipment and means which enable people to pursue their livelihoods (DFID 1999). Physical assets make the interface between natural capital and livelihood strategies of rural people possible; it allows human beings to work with their environment.

Human capital involves skills, knowledge, and ability to labor and good health important to the ability to pursue different livelihood strategies (Krantz 2001: 9). It constitutes the capability of individuals to pursue their livelihood strategies. The financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options make up financial capital. Finally, Social capital denotes the

social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods (Farrington et. al 1999; Bennett 2010:9).

While most of these assets are considered in terms of the household, they exist under the wider context which necessitates the mediating factors that promotes access and utilization (Morse and McNamara 2013:21). Resources can be destroyed or shaped by trends or shocks (Haidar 2009).

Vulnerability Context

Livelihoods are complex and changing and hence confront different risk. Risk factors that surround livelihoods are referred to as the vulnerability context. Vulnerability denotes proneness to a sudden, catastrophic, or fall in the level of living. It manifests as seasonality, sudden shocks and trends that grapple the consumption smoothing of households. Vulnerable households live in poverty trap (Løvendal, Knowles and Horii 2004; Ellis and Freeman 2005; Young et al. 2001).

Vulnerability context frames the external environment in which people make living. Shocks (economic, health, natural El Nino, conflict) can destroy assets directly (Kassa 2015; Defferew 2011; Gutu et al. 2012). Seasonal shifts in prices, employment opportunities and food availability are the most enduring sources of hardship for rural poor. Other factors involve governance and technological trends (DFID 1999).

Impacts of vulnerability to shocks vary. Drought for example impacts natural capital and in turn reduces crop yields. Population mobility in and out of a household or a community affects the level and intensity of social network. Demographic trends also have implication for landholding and fragmentation (Morse and McNamara 2013:35). For rural household, changes in resource like land, affects agricultural livelihood activities. Nonetheless, sensitivity of different livelihoods to shocks is not even. This segment of the sustainable livelihood framework addresses objective that accentuates

the challenges facing smallholder farmers in the study at hand.

Mediating Factors: Transforming Structures, Policies and Institutions

Transforming structures and processes within the livelihoods framework are institutions, organizations, policies and legislations that shape livelihoods. They mediate rural household's access to and control over resources (DFID 1999; Degefa 2009). Local and national structures arrange the access of resources for people to engage in fruitful livelihood activities (Scoones 1998). For a particular rural household, land tenure system, availability and functioning centers of technology, social services providing structures, participatory decision-making systems constitute a bridge through which household secure access to resources which are considered vital for livelihood.

Uncertain market environment that is noted with fluctuations in producer prices, high input prices, and poor input supply constrains farming activities and investments (Winters, Corral and Gordillo 2001). Rural land administration, rural employment directions, the functional linkages between rural households to the administrative agencies, and agricultural extension are also relevant transforming structures and policies under which rural livelihoods operates (Morris et al. 2002). Lack of appropriate credit provision system enforce smallholders to pursue pervasive agricultural extensification and hence encroach onto marginal lands. In the same vein, misguided land management, at the local level, result in informal land transfer which leads to landlessness and hence push agrarian households to look for low return activities in the non-farm sector.

Livelihood strategies

Ellis (2000) referred livelihood strategies as composed of activities that generate the means of household survival and are planned activities that men and women undertake to build their livelihood. They include productive activities, investment strategies and reproductive choices

(Alionovi et al. 2010 ; Haidar 2009:8). Choice of livelihood strategies depends on access to assets, policies, institutions and processes that govern resource utilization in order to achieve positive livelihood outcomes (Scoones 1998).

Since assets and accesses are unevenly distributed among households, livelihoods portfolio of households with in certain locality are various (Dorward et al. 2001). Many differences appear among those who are seemingly practicing the same livelihood strategy. Households with similar capital endowment may pursue different livelihood strategy because of different preferences, objectives, constraints and incentives attached to certain livelihood activities (Levine 2014:5). Therefore, besides asset endowments of households, the means through which households derive livelihood from a particular combination of on-farm and off-farm activities is more relevant criterion to understand poverty and resource use (Miyuki 2006).

Livelihood Outcomes

Households pursue certain livelihood activities in order to reduce vulnerability. Hence, the outcome of sustainable livelihood is beyond material needs (Haidar 2009). The outcomes of livelihood strategies include, but not limited to, increased income, more income, increased wellbeing, reduced vulnerability, improved food security, and more sustainable use of natural resource base (DFID 1999; Krantz 2001; Scoones 1998; Bennett 2010). These outcomes may be invested back on assets. For instance, increased income boosts financial stock (Castalonge 2008).

Livelihood outcomes are difficult to grasp and are not necessarily coherent. Yet, food insecurity is a core dimension of vulnerability of livelihoods (Walton 2012). This underlies the basic reason for which this study focuses on one outcome, food security, but implicitly tied to other positive outcomes. Fulfillment in other outcomes may not necessarily address household food security.

2.3. Review of Empirical Literature: Typologies of Rural Livelihood Strategies

Of the attributes of nowadays rural livelihoods are the presence of diverse livelihood activities unlike the conventional notion that posits rural way of life as entirely agrarian. Bifurcation of rural livelihood strategies has been done by different researchers over time (Zerihun 2012:4). Dominant classification is that can be made between agriculture (livestock and crop production), off-farm strategies (wage employment on others' farm) and non-farm (nonagricultural livelihood strategies wage employment outside agriculture, self-employment, property income and remittances).

Some studies used asset based approach to cluster households on the basis of livelihood strategies and uses the resulting strategy specific income distribution to test differences in welfare among identified livelihood strategies (Stifel 2010; Barrett et al. 2001; Ellis and Freeman 2005:185). Income, however, is unstable indicator of livelihood strategy. Rural households who has lost its production may have zero or negative income, but still they are agrarian (Alinovi et al. 2010:13).

For Scoone (1998), agricultural intensification/extensification, livelihood diversification and migration are the three livelihood strategies identified based on assets needed. Agricultural intensification involves an increased output (per fixed unit of land) due to frequency of cultivation, an increase in labor inputs or a change in technologies. Contrarily, extensification represents a situation under which households bring more land in to cultivation. It is typical factor for agricultural growth in SSA (Mkhize 2009; Loison 2015). Morris et al. (2002:14) argued that households' choice of between these strategies depends on agro ecological potential, labor and capital.

Alternatively, households spread their living across range of livelihood activities pursued, as an integral part of livelihood strategies. This may involve moving away from rural areas (Ellis 2007). Migration involves generating living across geographical settings. It depends on the economic and

social resources of the destination and original residence of people. Returns of migration have an implication on the asset and welfare status of the base households left behind (Djurfeldt 2015).

Livelihood strategies can also be accumulative and coping strategies based on their goals. Accumulative strategies involve activities to augment or transform the asset base while coping strategies comprise undertakings to ensure survival. For poor rural households whose agricultural livelihood is not strong to rely on, borrowing food, charcoal production, straddling between the urban and rural interface are of critical means to ensure living in Ethiopia (Suneetha and Solomon 2012). Paramitta (2013) found that households, whose land is expropriated under forced eviction, involuntarily engage in livelihood activities as a coping or necessity induced life making.

According to Bennett (2010) livelihood strategies of rural households involves the two broad categorization: natural resource based (gathering, food cultivation, and livestock keeping) and non-natural resource based (nonagricultural activities like rural trade, rent income, wage employment, transfer and service). This is classification of strategies by sector (Loison 2015:1126). Classifications reviewed so far show the context relativity of livelihood strategy grouping. The study at hand follows classification of strategies by sector in order to better depict the determinants and tradeoffs between agricultural and nonagricultural with respect to contributing to household food security.

2.3.1. Determinants of Rural Livelihood Strategies

Studies conducted on the determinants of rural livelihood strategies reveals different factors as predictors of livelihood strategy choices. Nonetheless, common among these studies is their focus on assets, institutions and contexts (Rahut et al. 2014). Some of them are discussed below.

Synthesizing the findings of different investigations, (Obi 2011) identified variables influencing livelihood strategy choices into individual characteristics, household characteristics and community

characteristics. A comparative study conducted in Ethiopia, Kenya and Uganda reveals that household head characteristics such as age, gender, marital status, health and educational status determine the livelihood strategy to be pursued. Accordingly, older household heads are more likely to pursue sedentary agricultural intensification than younger household heads. Older farmers adapt to the variable climate. Compared to women household heads, married and male household head are more willing to explore opportunities other than agriculture (Matsumoto et al. 2006).

Cross-national surveys of Barrett et al. (2001) in Africa found that human capital, as a function of education, conditions entry barriers to non-farm livelihood strategies. Hence, poor, uneducated, and women enjoy less access to remunerative livelihood strategies (Rahut and Scharf 2012; Loison 2015). This is in line with the study by Zakaria et al. (2015) which explicates the disparity in engagement on various livelihood activities between male headed and female-headed households.

For Brown et al. (2006), geographic location, family size, farming experience, access to credit and remittances are significant variables for choosing between livelihood activities in rural Kenya. Ellis and Freeman (2005:191) argued as non-farm livelihood strategies were more likely in households where the head has a relatively high level of education, family members belonged to credit and saving groups, and the household which receive remittance income that could finance non-farm activities. Rahut et al. (2014) found that the capacity and motivation to perform non-agricultural livelihood strategies is constrained by the number of children or other dependent members. Hence, the proportion of dependent members is negatively associated with the degree of pursuing multiple livelihoods (Saha and Bahal 2010; Amare and Belayineh 2013).

Landlessness, small landholding and unproductive land enforce rural households to pursue livelihood strategies other than agricultural intensification (Ellis and Freeman 2005). Adugna (2008) revealed that rural households with more land tend to operate agricultural livelihood rather than

diversifying as they draw more incentives of land productivity. Yishak et al. (2014) and Arega, Woldeamlak and Nicolau 2013) also claimed livestock ownership, and agro ecology as significant variables associated with the differential choice of livelihood strategies.

Other determinants work with institutions which are comprehended as community variables (Matsumoto et al. 2006). Access to extension, market, access to weather road, membership to cooperatives also predicts livelihood strategy choice. Defective infrastructure, scarce information and poor utility services curtail engagement in rural non-farm livelihood activities. Households with better access to knowledge on new ideas and varieties as well as to market and infrastructure would be more likely to choose high-return livelihood portfolios (Miyuki 2006; Yenesew et al. 2015). Farming households use social network to pool their resources and ease the task that would be difficult to a household per se. Self-help groups also free labor for other tasks Crop borrowing, labor, livestock and land sharing arrangements are typical of intact mutual support in rural Ethiopia. These have a paramount role in lessening chronic food insecurity (Yared 2001; Carswell 2002).

Ellis (2007) summarized the determinants of pursuing multiple livelihood strategies in to push and pull factors. The former results from disguised agricultural employment, inadequate access to fertile land, lack of access to farm input, markets, deterioration of natural resource base and incomplete credit among others (Obi 2011). Choice reasons for diversifying involve taking advantage of seasonal wage earning opportunities, investing in children education, saving to invest, and availability of growth engines like private investments (Barrett 2001:2; Stifel 2010; Loison 2015).

2.3.2. Livelihood Strategies and Food Security Linkages

Livelihoods strategies underpin food security (Patel et al. 2015). The most important aspect of livelihood to understand while analyzing household food security is the means by which people

produce food by themselves, and the means of securing income to buy food from other sources (Chikopela 2014). Strategies (agricultural or others) may lead to more or less satisfactory livelihood outcomes (food security in this study). Food insecurity is the result of unsatisfactory livelihood strategies (Clover 2003; Løvendal, Knowles and Horii 2004; Ncube 2014; ACF 2010).

If the livelihood activities of households are easily vulnerable or less adaptive to the changing situation, the ability of that household to produce for themselves or acquire food from other sources is quite challenged (Devereux 2004; Gathiaka and Muriithi 2013). Food production constitutes one of the critical livelihood activities and indispensable source of food access for rural households (Matse 2009:484; Sasson 2012:1).

Nonetheless, if a household cannot produce enough food of its own, its income level and food availability in the market determines its ability to acquire food in sufficient quantities (Woller 2009). This is justifiable for agrarian rural households who have gradually become a net purchaser of food and hence need cash income from diverse livelihood activities (Baiphethi and Jacobs 2009; Loison 2015). The problem, however, is that the poorest do not have resources either to grow an adequate quantity of food or to purchase it from the market. Their coping strategies are considerably minimal (FAO, WFP, and IFAD 2012:21). Echoing this notion, Devereux (2000:1) asserted that food insecurity in Ethiopia derives directly from dependence on undiversified livelihoods based on low-input, low-output rain-fed agriculture.

Matshe (2009) pinpointed that understanding of the structural predicaments sustaining food insecurity in African rural areas found their base in local livelihood strategies. The strategy choice results in some flows of food or cash. Consequently, poor households, whose farm activity is less productive and who have limited non-farm opportunities, are prone to food access insecurity. Now poor are potentially food insecure (Clover 2003; Gathiaka and Muriithi 2013:4).

2.3.3. Measuring Food Security Outcome

Attributed to its multidimensional and multicomponent nature, food security remains a tricky concept to measure. As a result, suites of indicators were proposed and adopted over time with in different contexts (Ballard, Kepple and Cafiero 2013). Dietary energy supply (DES), household and individual level of energy intake, household dietary diversity (Hoddinott and Yohannes 2002), experience based household food security measurement (Coates, Swindale and Bilinisky 2007) and anthropometry are among the dominant measures of food security (Kirkland et al. 2011).

Dietary based measurements (either nationally or at household level), inclined to the food availability or supply dimension of food security. These measures focus on household food expenditures and calorie intake. Hence, households' dietary level is measured against objectively set threshold measurements. It involves converting household food consumption into calories and averaging out the household-level figure. FAO's (2010) populations' average energy requirement of 2200 kilocalorie/capita/day obeys this measurement (Walton 2012; Gathiaka and Muriithi 2013).

Though these measures are relevant, if done carefully, in examining idiosyncratic level of consumption in detail, they are indirect measures and thus result in misclassification of households into food security levels. Objective measures overlook cross-cultural variation among people and assume ideal food distribution in the market economy (Deitchler et al. 2010; Burchi and De Muro 2012). Moreover, dietary and expenditure measures incline to nutrition security which is the resultant state of food security (Oni and Fashogbon 2012 Moltedo et al. 2014:5).

Experience based food security measurement embraced by Household food insecurity access scale (HFIAS) was developed by Food and Nutrition Technical Assistance (FANTA) in 2006 against nutritional indicators of household (malnutrition and food consumption) (Coates, Webb and Houser 2003). HFIAS is drawn on subjective (self-reported behaviors) of households. Household food

insecurity (access) is measured using validated Household Food Insecurity Access Scale Version 3 (Coates, Swindale and Bilinsky, 2007).

HFIAS incorporates three fundamental components: uncertainty and anxiety over food, perceptions that food is of insufficient quantity and quality, and reported reduction of food intake due to lack of resources (Swindale and Bilinsky 2006; Gathiaka and Muriithi 2013). HFIA questions were culturally adapted to include local examples. Results of HFIAS were substantively used in the context of resource poor developing countries like Uganda, Burkina Faso, Bangladesh, Kenya, Zimbabwe, Mali and South Africa (Walton 2012; Coates, Webb and Houser 2003; Webb et al. 2006; Kirkland et al. 2011). As a result, questions involved can be added to a standard baseline and final household survey and adapted to the purpose of the study (Deitchler et al. 2010).

In Ethiopia, cross-sectional studies in urban and rural villages in southern Ethiopia found that HFIAS is a valid tool to capture household food insecurity access. Researchers translated the scale into local language, tested face validity, internal consistency using Cronbach's alpha and factor analysis, tested for parallelism on HFIAS item response curves across wealth status using two rounds of data collection (Seifu et al.2015). The HFIA questionnaire was used in this study in an effort to assess the level of food security and compare food insecurity among livelihood different groups.

2.3.4. The Political Economy of Small Holder Agriculture and Food Security in Ethiopia

Scoones (2009:183) suggested a more detail understanding of the local livelihood with due attention to power, politics and the governance context of people. The following few paragraphs notes on policies, actors and outcomes of development paths in the agriculture of Ethiopia.

Smallholder agriculture is widely acknowledged by agricultural development led industrialization (ADLI) relative to the monarchical and military regime. With large rural population, labor-intensive

approach is presumed relevant in Ethiopia while gradual technology domestication is cherished. The assumption behind is forward (raw material) and backward (farm input) linkage that will benefit the large majority and transform agriculture to the deemed point, industry. Agriculture is promised to address food insecurity and poverty at large. State ownership of land was assumed as restricting the emergence of class differentiation among peasantry (MoFED 2002: Dessalegn 2009).

However, with small per capita landholding, the sector failed to shoulder the onus of transforming the economy. Subsistence production precludes the forward linkage while poor domestic production of fertilizer curtailing backward linkage. The most dramatic evidence of ADLI's failure thus far is persistent food insecurity in many rural areas and reliance on food aid over time ADLI (Lavers 2012:110). Added to this is the recent land transfer for investors as way of complementing smallholder farming but which opens up competition over resource than ameliorating the condition of rural poor (Kassahun 2012).

Subsequent national development programs from early 2000's depend on ADLI strategy (MoFED 2005). Government's efforts of reducing food insecurity through smallholder farming and the need to maximize investment are however not complementary rather bring about the coexistence of dual agents with limited interface. Availability of large labor and land potential attract investors. However, diversion of scarce land from food production may have a less-than-desired impact of surmounting food insecurity. While large investments increase the productivity of uncultivable land, develop public infrastructure, and create employment, they are far from automatic. The government is silent on power-imbalances between large multinational economic actors and poor, often illiterate peasant farmers (Aabø and Kring 2012).

Lavers (2012) further argued a compromise between political and economic priorities. The first maintains the politically-sensitive smallholder sector in the highlands, through redoubling efforts to

increase cereal productivity while the second has to do with maximizing return from large investment (MoFED 2005: 47). Though the assumption is that the land to be used by investors is seen as ‘marginal, low land’ in practice it is not. In doing so, the original aim of ADLI is lost in favor of trade; it results in shielded elite investors uplifting their profits at the expense of farmers’ resource. With long spikes in food price and large food insecure people, the policy prioritizing currency then to address food is far from its goal, even in leading nations of neo-liberalism(Lavers 2012).

Damaging the food security efforts, incomes, livelihoods, and environment for local people is mounting with land acquisition (Moges 2010; De Zoysa 2013; Haggblade and Hazell 2010). Another key issue is displacement. Separating farmers from their land without simultaneously creating opportunities in nonfarm sector is likely to aggravate poverty, unemployment and food insecurity. The nature of investments claiming more land in Ethiopia are neither food producing so that they at least ease the food aid dependency nor pay back to agriculture to survive (OXFAM 2011).

Conclusively, low performance of agrarian livelihood and resultant food insecurity is not confined to capitals and natural vulnerabilities (Kamara and Brixiova 2010:12). Now day’s predicaments to assure secure livelihood are attributed to institutions and powers (Mkhize 2009; Tsegaye 2012).

2.4. Conceptual framework of the study

Based on the main objective initiating the study and empirical works reviewed, the conceptual framework was developed. The framework is constructed on the components and linkages established among the variables in the literature reviewed.

Figure 2.2 portrays that rural households make their livelihood by combining assets accessed through different mediating factors. The nature of land administration, performance of market and social service affects the resource access and asset development which in turn influence livelihoods.

The resultant livelihood strategies can be agricultural or not. Based on their activities, some produce their food for themselves while other relies on purchase. These strategies determine the food access security at household level. Social networks can also directly affect food access. This can be through food transfers which support households to fill their food need gap in time of shortage.

Agrarian households combine their assets under natural vagaries which have paramount effects on livelihood strategy choice. Erratic rainfall directly devastates crop and thus curtail food availability. In addition to this, mining investments which claim agricultural resources also affect the resource use pattern and livelihood-making endeavor of people in the study area.

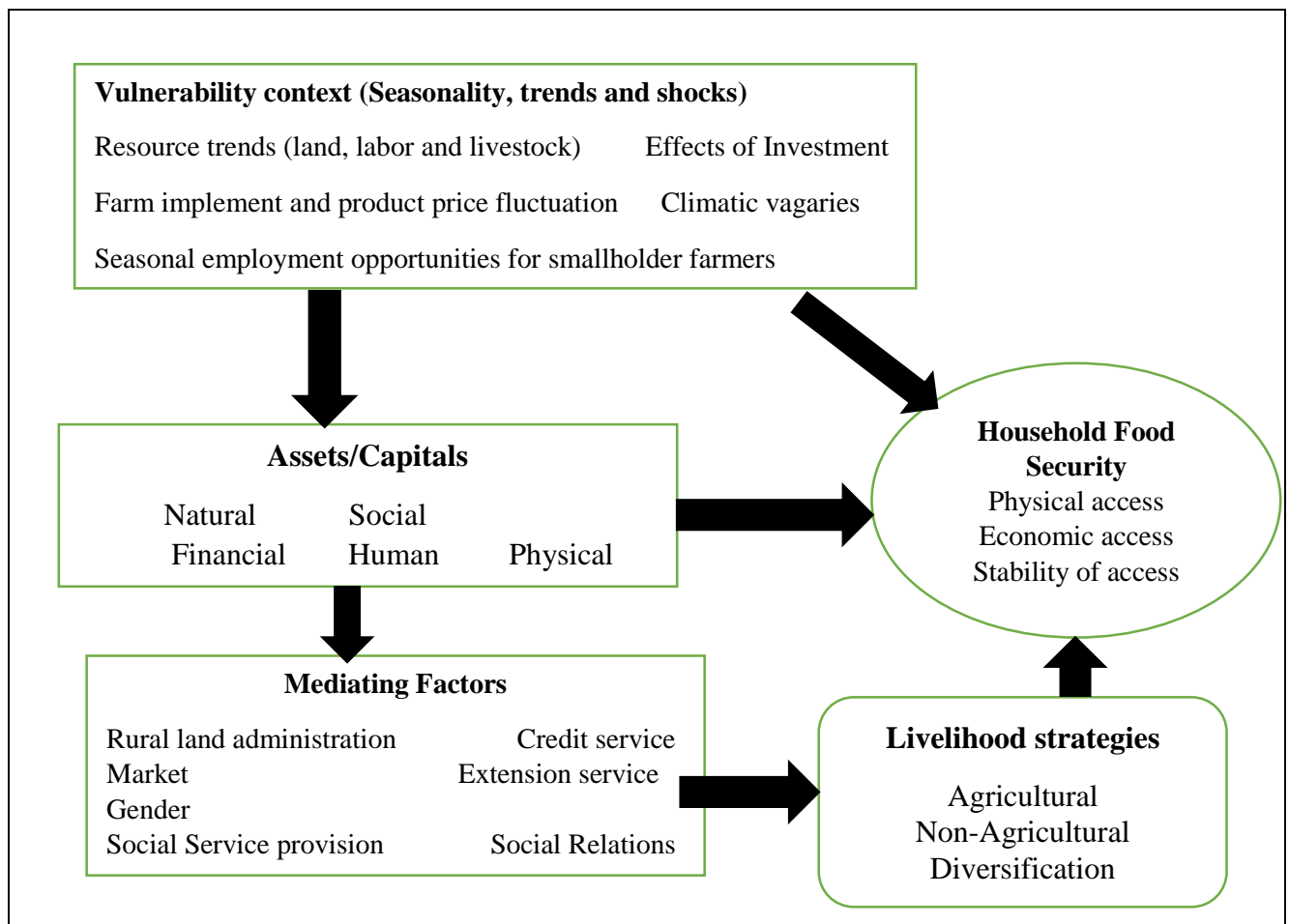


Figure 2.2. Conceptual Framework of the Study (Own Construct, 2016)

Chapter Three

Study Setting and Research Design

This chapter of the study discusses the methodological underpinnings through which the objective of the inquiry was achieved. It incorporates the setting of the research and methods employed. Accordingly, sections that follow describe the study population, research approaches, methods and instruments of data collection, sample and sampling procedures, source and types of data, and methods of data analysis. Ethical issues and limitations of the research process are also described.

3.1. Description of study setting

Sululta *Woreda* is one of the *Woredas* in Oromia regional state of Ethiopia which is situated at about 40 Km North West of Addis Ababa. It was formerly named as Mulo and Sululta. After it was separately recognized as an independent *Woreda*, Sululta is administered under Special Zone Surrounding Finfinne (SWARDO 2014).

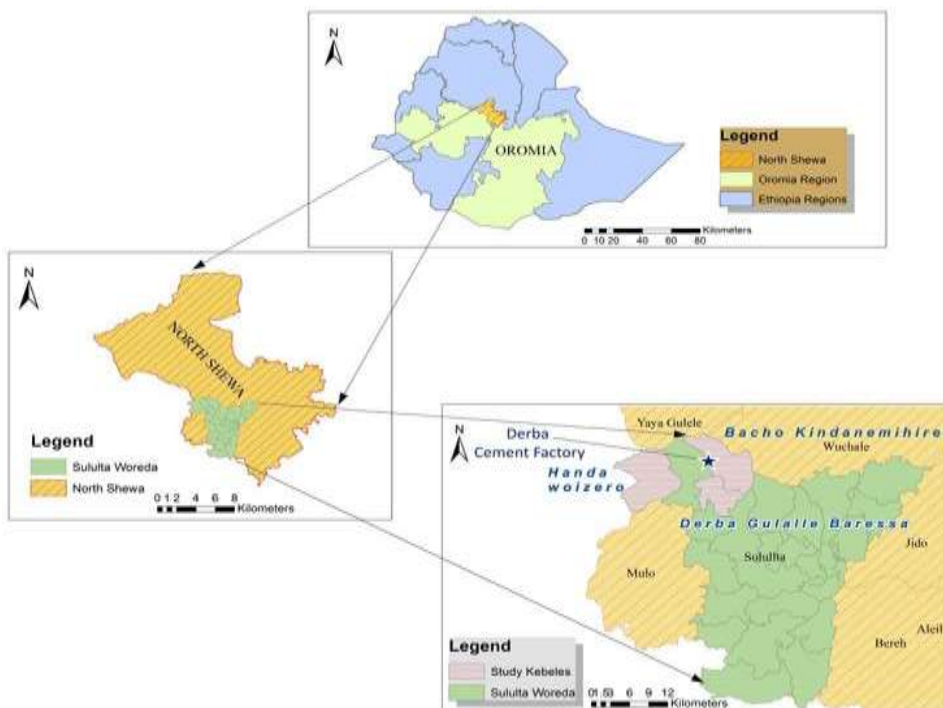


Figure 3.1. Map of the study area

Geographically, Sululta *Woreda* is demarcated by Wuchale and Yaya Gulalle *Woredas* in North, Addis Ababa city and Wolmera *Woreda* in South, Jida and Bereh *Woredas* in the East and Mulo *Woreda* in the West direction (SWARDO 2014). The study area is found between 9.07°-9.52° N and 38.53° -38.98° E. Climate, land use, and demography of the study area were presented below.

Sululta *Woreda* exhibits three major agro ecological conditions. These are Kola (Low altitude), which accounts 3.6%, Dega (high altitude) that covers 71% of the study area and Woina Dega (mid altitude) climate comprises 25.4% of the area. The altitude of the study area ranges between 1500 to 3571m. The mean annual temperature is 15.36°C with the mean minimum of 6.2°C in December and maximum 22.9°C in February and May. Adugna (2008) and Mkhinze (2009) noted that agro ecology affects the livelihood strategy choice of rural people and hence the outcome.

The total annual rainfall of the study area is about 1722.6 mm with an average of 1143.5mm. Sululta *Woreda* is characterized by two main rainy seasons, *Meher* and *Belg*. The former is relatively longer rainy season which is, of course in line with, other *Woredas* of Ethiopia and last from June to September. Recent studies conducted in the area, however, revealed that *Belg* season rain is dwindling and hence production gained from rain during this period is deteriorating over time (Kassa 2015; Defferew 2011; Getachew 2014).

According to Sululta *Woreda* Agricultural and Rural Development Office (SWARDO 2014) the landforms of the area involves plains (46%), rugged topography (22%), plateau (26%) and mountains (6%). Cambisols, Nitosols and Vertisols are typical of the soil composition in the *woreda* which accounts for 49%, 24.5% and 0.5% respectively. The remaining soil typologies make up 26 percent of the land. Muger is the most important drainage basin of the *Woreda* which together with its tributaries flow into Abbay River. Aleltu, Labu, Chanco, Bole, Duber , Gorfo and Dhokatu are the main rivers making Muger.

The confounding setting of the drains, Muger valley, is currently attracting mining investments for its rich minerals like limestone, sand stone, clay and gypsum (DMC 2008). Derba cement is the major plant operating in the area and claiming land of farmers at the same time. The plant site covers about 125 hectare initially and expanding. The study area had once been rich in species composition. Mountains and gorges that typify the area had once been covered by forest species involving *Juniper Procera* (tid), *oleo Africana* (woira) and *Podocarpus* (zigba). Their abundance and distribution is highly affected by anthropogenic factors such as marginal land crop cultivation (extensification), grazing, charcoal production, and largely deforestation for domestic use (Gutu et al. 2015).

According to 2007 National Census Report, the total population of the woreda is 129,000 of which 64,516 are males and 64,484 are females. The same report shows that 11.74% of the Suluta Woreda population is urban resident. As per to CSA (2013) population projection from 2014-2017, the study area has 160,837 total population; 138,552 (86.1%) are rural dwellers and 50.2 percent are females. Population density of the area is 147 people perkm². Sululta woreda has 23 rural kebeles and 3 towns. Of the rural kebeles 9 are in highland, 11 in midland and 3 are in the lowland altitude.

The total area of Sululta Woreda is 109,269 hectare. The GIS based poverty analysis and mapping in rural Oromia regional state (2012) depicts that about 61.88 percent is cultivable land while tree cover, grassland, shrub, unproductive and investment land account for the remaining proportion. The dominant economic activities in the area involve, but not limited to, crop production, livestock raising, handcraft and trade arranged from the higher to lowest rank. Cropping is mainly subsistent and livestock production particularly dairying is the major source of livelihood (Fekede et al.2013).

3.1.1. Justification for study Site Selection

Suluta Woreda, was selected owing to prior vulnerability researches' findings indicating the changing asset base and living conditions. The other motive was the increment of private investment

in the area which claims farm resources like land and labor while contributing to the local livelihood system through infrastructural development and employment creation. However, location specific investigation that apprehends the livelihood strategies of rural people, their food security situation and challenges they are facing with respect to maintaining their livelihood was not available. These factors prompted this study to be done in Suluta Woreda.

3.2. Sampling and Sample Size

3.2.1. Sampling for Qualitative Data

Key informants for this study were selected purposively based on the assumption that they have knowledge regarding the theme under investigation and hence provide adequate data. This enabled the researcher to collect detail data from informants: kebele and woreda officials, model farmers, poor households, agricultural extension workers and those affected by cement investment. Suggestions of agricultural extension workers working in the area were of vital input but bias with this respect were cared. Prior familiarity with study area, informal and inbuilt contacts with people contributed a lot with this regard. The same procedure applies for selection of participants of FGDs.

3.2.2. Survey Sampling

In order to infer from the sample at hand, probability sampling is the right procedure to select the unit of observation. When constructing a probability sample, the purpose is to select cases so that the final sample is representative of the population from which it was drawn. To use simple random sampling technique, a list of all cases is needed in the population and a system of selection that will guarantee that every case has an equal chance of being chosen for the sample (Healey 2009). This is sample frame, from which a researcher draws a sample and generalizes (Bernard 2006:149). For this study, a document consisting of all rural households of *Sululta Woreda* is nonexistent. In such a situation, multi- stage cluster is appropriate (Yeraswork 2010). Cluster sampling is a way to sample

populations for which there are no convenient lists or frames (Bernard 2006:157). Since rural livelihood analysis in Ethiopia is agro-ecological sensitive (Tsegaye 2012), agro-ecology was a stratifying variable. As a result, the sampling technique for this study was stratified area cluster sampling. Specific study areas were clustered depending on the agro-ecological conditions.

The procedure starts with categorizing the woreda in to agro-ecological conditions it exhibits: Kolla, Woina Dega and Dega. Twenty-three rural kebeles were identified to their category based on the data from Sululta Woreda Agricultural and Rural Development office. Secondly, three kebeles (one from each agro ecological zone) were selected from each agro ecology through lottery method. Based on the procedure, Handa Woizero (Kolla), Becho Kidanemihiret (Woina Dega) and Derba gulalle baressa (Dega) were selected. The total number of households of kebeles was 498, 626 and 544 respectively which yield a total of 1668 households.

Sample size was determined by computer at 95% confidence interval for the total population. Rao soft sample determination formula resulted a sample size of 215 households. Finally, the sample size was administered proportionate to the size of the households in each kebele selected. The sample size for each kebele is a multiple of proportion of each kebele proportion (P) and sample size (n/N *sample size). P for each kebele is the ratio of each kebele households and the total households (N) of kebele selected (1668). Accordingly, 64, 80 and 71 households from Handa woizero, Becho Kidanemihiret and Derba Gulalle Baressa respectively were selected.

3.3. Mixed research approach

This study employed mixed research approach; it embraces both qualitative and quantitative approaches. Mixed approach involves collecting and analyzing diverse types of data to comprehensively understand a research problem (Creswell 2003). Livelihood researchers need to

combine quantitative and qualitative research approaches and to be sensitive to the various ways that households earn their livelihood and the key types of capital that are crucial for those livelihoods (Ellis and Freeman 2005:21; Kanbur 2001). Mixed approach mediates between the limitations with the representativeness of sample of qualitative approach and reductionist nature of the quantitative approach (Chambers 2001; Degefa 2005). These features underlie the use of mixed approach in the study at hand. Details of research approach and methods employed in the study are presented below.

Quantitative research approach emphasizes quantification and measurement in the collection and analysis of data (Yeraswork 2010:20). In this study, quantitative approach assesses household specific data such as food security indicator, household composition, possession and access to assets, household income and food intake pattern. Survey method was used in order to collect measurable data from sample households using questionnaire.

Qualitative research approach is employed when the purpose is to inquire deep into the meaning individuals or groups ascribe to the research problem under study based on the context in which they make their livelihood (Degefa 2005). Qualitative data pertaining to livelihood and food security under this thesis involves the various livelihood activities, institutional contexts governing access to resources, vulnerability to shocks, subjective meaning with respect to food security, experience, social relations and networks in rural livelihood. Moreover, qualitative data include location specific challenges facing smallholder farmers. Focus Group discussion, in-depth interview, key informant interview and observation methods of qualitative approach that were used with interview checklists.

3.3.1. Survey Method

Survey research was deployed to tackle objectives dealing with enumerating livelihood activities of respondents, identifying factors determining the livelihood choices, food shortage patterns, food security status and linkage between livelihood strategies and household food security. Collecting,

measuring and analyzing data on variables involved in this study were done at the same point in time, between January and June 2016. Therefore, cross-sectional survey design was considered relevant. Nonetheless, in addressing the objective that aimed at examining challenges facing farming household, approximating the longitudinal data to survey period was imperative. This survey design was used to grasp resource trends: of land, food production and access, farm labor and natural resource base which eventually affect the livelihood performance of farming households.

Quantitative data was gathered through semi-structured questionnaire that comprises more close-ended questions supplemented with open-ended questions to extract post-coded data based on the pattern of response. Close-ended questions were complemented by ‘If other please specify’ category in order to make categories more exhaustive and collect qualitative data concurrently. Household food insecurity access scale (HFIAS) was included with questions that embrace socio-demographic, livelihood activity, assets and challenges. Thus, the questionnaire has two parts.

The first part deals with livelihood assets, activities, determinants, and challenges. The second part comprises measure of household food (in) security, Household food insecurity access scale (HFIAS). The scale consists of nine questions having two types of interrogations. These are ‘occurrence questions’ that indicate the prevalence of particular food insecurity condition over the time specified, and frequency of occurrence questions that determines how often the condition occurred.

Occurrence question statements have time frame and two response options (0 = no, 1 = yes). There is also a ‘skip code’ next to each “no” response option. The frequency of occurrence is skipped if the respondent report that the condition described in the corresponding occurrence was not experienced (0, meaning no for occurrence) within the reference period. Each frequency of occurrence question has three responses (1 = rarely, 2 = sometimes, 3 = often) if the occurrence response is answered ‘Yes’ that is coded 1 (Coates, Swindale, and Bilinsky 2007) (see appendix 1).

Accordingly, the maximum score for a household is 27 (if a household responded to all nine frequency-of-occurrence questions “often”, coded with response code of 3). The minimum score is 0 (if a household responded “no” to all occurrence questions, frequency-of-occurrence questions were skipped by the interviewer, and subsequently coded as 0). The higher the score the more food insecurity (access) the household experienced and vice versa. Severely, moderately, mildly food insecure and food secure category results from the scale score (Deitchler et al. 2010).

Conceptualization of core Terms

Household: the social group which resides in the same place, shares the same meals, and makes joint or coordinated decisions over resource allocation and income pooling (Ellis 2007).

Livelihood diversification: process by which rural households construct an increasingly diverse portfolio of activities and assets to survive and to improve their standard of living (Ellis 2000)

Smallholder farming: or family farming is a farming that relies on household labor and land. It operates with family as the center of decision-making and implementation, within a network of relations at the community level (Murphy 2012; Salami, Kamara and Brixiova 2010).

Access: represents a differential ability of households to command, and use resources in pursuit of making living (Moorse and Mc Namara 2013).

Operationalization of concepts

Table 3.1. Operationalization of Core Concepts

Concepts	Variable	Indicator	Measurement
Livelihood strategy	Livelihood strategies of HH	Types of activities pursued	List of livelihood activities_ Nominal Agricultural, nonagricultural, both
Human Capital	Family size	Total Number of people living in a Household	Count of people living in a household Ratio
	Dependency ratio of household	Number of individuals under 18 and above 65 in a HH	Counting number of dependent people in a household/independents _ Ratio

	Educational level of Household head	Highest level of education attained by household heads	Count of the number of years spent in school_ Ratio
	Health status of HH	Perceived health situation	Self-rating of health_ Ordinal
	Skills of HH	Types of skill possessed	List of skills,_ Nominal
	Training received by HH	Types of training received	List of trainings_ Nominal
Physical Capital	House ownership	Ownership and type of house	Mud wall, grass roofed (nominal)
	Access to information	Proximity to market, town	Walking distance from home (in Hr)
	Access to infrastructure	Proximity to road, and water	Walking distance from home (in Hr)
	Ownership of productive tools	Types of (farm) tools	List of tools owned, Nominal
Natural capital	Livestock ownership of HH	Whether owned or not	Have/have not__ Nominal
	Number of livestock owned	Total number of livestock	Count of total livestock_ Ratio
	Land ownership of HH	Ownership	Have/Have not _Nominal
	Land Size	Hectares of land owned	A total hectares of land owned, Ratio
	Perceived fertility, and adequacy	Own rating of level of fertility and adequacy	Less fertile, fertile, more fertile; Scarce, adequate, abundant _Ordinal
Financial capital	Saving capacity of household	Total amount of ETB saved	Amount in ETB _Ratio
	Access to Credit service	Membership to credit service providing associations	Member/not _ Nominal
	Total annual income	Income from all sources and all household members	Amount of ETB secured from crop, employment, livestock or others, Ratio
Food security	Household food security score	HFIAS scale measure	Recording the cumulate (0-27)_Ratio
	Household food security level	HFIAS score categorization	food secure, mildly, moderately and severely food insecure access_ ordinal
	Household food security status	HFIAS score categorization	Food secure, food insecure _Nominal

3.3.2. Focus Group Discussion (FGD)

FGDs were employed to generate data that complements survey and it was more useful to tackle objective that focuses on challenges facing smallholders. Accordingly, livelihood activities, assets and their trends, social service provision and experience of food insecurity were assessed through discussions. Four general checklist with sub focal areas coinciding specific objectives were used.

Three FGDs (one for each Selected Kebele¹) were undertaken. Discussants were selected based on their age, sex, wealth rank, main livelihood and development groups² to which they belong. No participant was less than 18. Extension workers were the main role players in selecting discussants from poor, medium and better off households. The number of participants per discussion group was 12(5 are females) in Derba Gulalle Baressa Kebele and 9 (3 are females) in Bacho Kidanemihiret. The number of participants in Handa woeizero was 11 (6 are Females). The proportion of male and female participants was based on their availability during the schedule of discussion. Development group leaders and enumerators were oriented and took the duty of moderating discussions while the researcher shouldered the role of keeping consistencies with the objective.

All FGDs were conducted at the convenient time of discussants based on appointment negotiated with facilitators: *kebele* chairperson and extension workers. Chairpersons and agricultural extension workers convinced participants to present on time and discuss. While discussion in Derba Gulalle Baressa was held at a place where people work on soil conservation, the remaining two discussions were held at a time of edir associations. On average, FGDs last for 1 hour.

3.3.3. Key informant and In-depth interview

Key informant interviews were conducted with different individuals at different administrative levels. At Kebele level, three-kebele chairperson/Manager and three agricultural extension workers were interviewed. At the Woreda level, officials from Agricultural and Rural Development Office, and Rural Land Administration and Environmental Protection office were the main targets. In addition to this, livelihood and crop development experts were interviewed based on the suggestion of agricultural and rural development office. One personnel from each office was interviewed.

¹ The smallest administrative unit in the Ethiopian Federal governance structure.

² Divisions within *Kebeles* based on neighborhoods. This grouping is crucial for mobilizing rural people and their resources on the matter of common interest.

In-depth interview were employed to extract detail data from key informants through face-to-face interaction. Two model farmers³, three households affected by cement factory and three household heads noted for their low living standard per kebeles were interviewed in-depth. Selection of interviewee was gender sensitive. The theme of interview involves livelihood activities of the households in the area, changes in the asset base, availabilities and practices of alternative livelihood, challenges experienced in agricultural livelihood, occurrence of food insecurity and the subjective perception of linkage between livelihood activities and household food security.

3.3.4. Field Observation

Direct observations were made to enrich data obtained through FGDs, survey and key informant interview. It was relevant for gathering data regarding community assets (infrastructures) that are related to rural livelihood, the land use pattern, and livelihood activities of people and the impact of cement factory on the livelihood of smallholder farmers. Moreover, visits were made to farms surrounding Derba cement factory, homes of model and poor households, centers providing agricultural related services and market places. Where applicable, transact walks down the Kebeles involved photographs. Observational data was generated through unstructured sheet containing issue to be observed, places to observe and activities such as note taking or capturing. The researcher was also benefited from participation in farmers' discussion sessions, and soil conservation activities.

3.3.5. Methodological Triangulation

Triangulating data sources is used for seeking convergence across qualitative and quantitative data (Yeraswork 2010). In this study, both qualitative and quantitative data were gathered in one phase of data collection and integrated in to the interpretation of the overall results. Therefore, concurrent

³ Farmers which have relatively better income, adopt more farm technology, produce more and better sustain their food need. They lead better livelihood combinations which are noted as with good return.

procedure of data collection was applied as a strategy of converging data. This was vital to both validate and expand the interpretations of data collected and presented through different methods.

Concurrent procedure also informed the appropriate key informants to be included. Following this, data that was obtained from household through survey was triangulated with data that was collected from key informants through key informant interview. Furthermore, survey and key informants' data was also converged with FGD data. Table 3.2 depicts a summary of methods employed, source involved, data required to achieve the main objective of the study.

Table 3.2. Methodological Triangulation: Converging data, source and methods

Objectives of the study (For what purpose?)	Unit of Analysis (About what?)	Observation Unit (From who?)	Methods of Data Collection (How)
To describe the livelihood strategies of households	The livelihood of sample households	-Sample households -Model farmers -Poor households	Sample Survey FGD In-depth interview
To identify the determinants of livelihood strategies of rural households	Determinants of household livelihood strategy choice	-Sample households -Kebele and woreda officials	Sample survey FGD, Observation In-depth interview
To explore the challenges facing small holder Farmers in the area	Predicaments of agrarian livelihood	-Sample households -Local leaders -Agricultural extension workers	Sample survey FGD, Archival In-depth interview Observation
To assess the food security situation of households understudy	Household food security status	Sample households	Sample survey In-depth interview
To examine the impact of livelihood strategies on household food security	Impacts of livelihood strategy on household food security	-Sample households -Agricultural extension workers	Sample survey FGD In-depth interview

3.4. Source of data and procedure of data collection

Survey instrument was translated into Afan Oromo. Primary data on household livelihood activities, determinants, challenges and food security situation was collected from sample households and key informants using survey and in-depth interview respectively. The duration of fieldwork for this study ranges from January 29 to March 3, 2016. While survey questionnaire was supported by enumerators recruited from University graduated students in the locality, key informant interview and FGDs were carried out by the researcher. Survey was administered at home and place of work of respondents.

The questionnaire was pretested with five purposively selected respondents two weeks ahead of the main data collection endeavor. Lessons with respect to simplifying wordings, measurement, clarity, and length of the questions were vital gains of the pretest exercise. It helped refining and integrating corrections into the final survey. Pretesting also had a paramount relevance in checking the validity of the instrument; whether the instrument measures the concept it was claimed to measure. Face validity of the categories in the instrument and criterion validity were examined and no critical deviation was observed. This enabled the researcher to collect data within in the schedule proposed.

Secondary data in this study comprises reports of the Sululta woreda agricultural and rural development office, reports at kebele level, review of related books and journals, unpublished baseline assessments and CSA reports. Official reports on provision of social service, trends in productivity, patterns and elements of livelihood vulnerability, the change over time of land and other assets were assessed from archival sources for comparison of data with survey. Secondary sources also served the demographic, geographical, and economic information of the study area.

3.5. Method of Data Analysis

This section involves the way of searching for patterns in data in such a way it is linked back to the objective that initiated the study. Accordingly, qualitative data that resulted from note taking and

recording activities was transcribed, categorized and organized in to themes (objectives of the study) and expressed to give concrete meaning. Qualitative data results were triangulated with survey results in order to address the general objective in detail.

Quantitative data analysis was mediated by statistical tools of data processing. Statistical package for social science (SPSS) version 20 was used for this purpose. Measurable data was coded, entered into SPSS database, cleared, organized and presented in tabular format. Both descriptive and inferential statistics were used. Descriptive statistics were employed to describe the features and distribution livelihood strategies. Frequency distributions, averages, and measures of dispersion were computed. Bivariate analysis was dominantly used for identifying the association between variables (independent and dependent). Cross tabulation was vital presentation to inspect patterns of association between categories of independent with the categories of the dependent variable.

Inferential statistics was computed to locate the parameter of interest in the population through drawing conclusion from sample statistic. One way ANOVA (Analysis of variance) was computed to see whether there are differences among groups with different livelihood strategies in relation to the average of continuous dependent variable (HFIAS score). Chi- square test was conducted in order to test the association between categorical variables and livelihood strategies identified.

Lastly, multinomial logistic regression (MLR) was adopted to test the effect of dependent variables (either metric or dichotomous) on the dependent variable with more than two categories. In this study, dependent variables, livelihood strategies have three categories and food security status has four categories and hence suit to MLR. Prior to the estimation of the logistic regression model, the existence of multi-collinearity was checked among explanatory variables. Variance Inflation Factor (VIF) was used to measure the degree of linear relationships among continuous explanatory

variables and contingency coefficient was used to check for association among discrete variables. VIF for all variables used in the study less than 10, and thus non-existence of association between the continuous variables included in the model was confirmed.

3.6. Ethical consideration

This study starts its operation after official letter was issued by Addis Ababa University, Sociology Department. The researcher took the letter to secure approval of concerned administrative structures and the research participants during fieldwork. However, where the letter seems unlikely to function oral informed consents were made with the respondents prior to undertaking the main research task. This was done in line with negotiating that the study is free of any harm on the respondents or discussants. Intensive rapport was made with respondents before any data collection tasks. Respondents were convinced that the data serve only academic purpose and have no effect on them. Above all respondents were assured on the basis of their confidentiality. No names of respondents were disclosed in any data analysis sections.

3.7. Limitations and Challenges of the Study

Theoretically, this study was delimited to livelihood approaches than integrating other sociological theories. With regard to sampling, the researcher determined sample size for the total number of households from three selected kebeles and administered proportionate to size of kebeles. The sample size would have been large and more representative if it had been determined separately for each kebele. Getting disaggregated data on production trends, food security baseline and livelihood activities to compare with sample findings were a critical hurdle this study suffers from. Respondents were very cautious on telling land size and information related to implications of cement investment. In fact, this thesis has been conducted during the time when there were land related disputes in the study area. For a research in rural area, in three kebele, the finance allocated was inadequate.

Chapter Four

Socio-demographic profile and Livelihood strategies of Households

This chapter has two main sections. The first section deals with the socio- demographic profiles of sample households. The second section describes the livelihood strategies pursued by households. It focuses on livelihood activities and their classification into livelihood portfolio: agricultural, non-agricultural and a combination of both livelihood strategies. Derba cement and surrounding rural areas are the main contexts for the livelihoods of the selected households. Cross tabulation, descriptive statistics and narration of qualitatively procured data were involved in presenting the finding. Analysis proceeds through triangulating findings of qualitative and quantitative approaches.

4.1. Socio-demographic profile of Sample Households

This study involved 72.1 percent male and 27.9 percent female respondents. With regard to marital status, 151 (70.2 percent) were married, and 23(10.7 percent) of the respondents never married. Divorced and widowed respondents constitute 10.2 percent and 8.8 percent respectively.

Of the total respondents, 43.7 percent did not attend formal education. Table 4.1, depicts that 38 percent were not able read and write while 5.6 respondents were only able read and write. The number of households gently decreases with an increasing in educational level. Almost half, 107 (49.7 percent), of respondents had elementary education. While 12 (5.6 percent) respondents attended high school (grade 9-12), only one percent of respondents had diploma level education.

Concerning the age category of respondents, majority of them belong to the productive age group, between 18 and 65 years. The average age of respondents was 44. Table 4.1 indicates that 66 percent of the sample households had a household size of 6 to 10.

Tabale 4.1: Sex, marital status, educational level, age of respondents and household size

Characteristics		Frequency (N=215)	Percentage (%)
Sex of respondent	Female	60	27.9
	Male	155	72.1
Marital Status of respondents	Never Married	23	10.7
	Married	151	70.2
	Divorced	22	10.2
	Widowed	19	8.8
Educational Level of respondents	Unable to read and write	82	38.1
	Read and write	12	5.6
	Primary cycle elementary (1-4)	59	27.4
	Secondary cycle elementary(5-8)	48	22.3
	High school (9-12)	12	5.6
	Certificate/Diploma (10+3)	2	1
Age of respondents	18-29	30	14.0
	30-39	71	33.0
	40-49	50	23.3
	50-59	37	17.2
	60-69	16	7.4
	70+	11	5.1
Household size	1-4	71	33.0
	5-10	142	66.0
	11+	2	.9

Source: Sample survey, 2016

The section that follows discusses livelihood strategies pursued by households in the study area. It introduces the livelihood portfolio classification used in the study and followed by specific livelihood activities making each cluster.

4.2. Livelihood Strategies

Rural areas are characterized by the presence of diverse livelihood activities. Some are farm related and others not. They include productive activities, investment strategies and reproductive choices. The outcome and barriers of these strategies are different. Livelihoods approaches try to understand the strategies pursued and the factors behind people's decisions; to reinforce the positive aspects of these strategies and mitigate against constraints (Hidar 2009:7). Thus categorizing households based on strategies they pursue offers a good insights in to the analysis of outcomes like food security (Alionovi et al. 2010).

This study followed clustering livelihood activities based on sectors. Accordingly, sample households were grouped into agrarian, non-farm and those who pursue both agricultural and non-agricultural livelihood strategies with each having specific livelihood activities. The majority of sample households were confined to agricultural livelihood activities. Table 4.2 shows the distribution of livelihood strategies of sample households across the three selected agro ecologies. Households pursuing only agricultural livelihood constitutes 47.4 percent of the sample. These groups of households are those who make their livelihood from crop cultivation and livestock raising. Agro-ecologically, 43(20 percent) households who pursue only agricultural livelihood cluster belong to highland.

The non-farm livelihood category consists of households whose main living is based on activities outside agriculture. These include wage labor in factories, self-employment in own business, trade of grains, petty trading, trade of livestock. In addition to this, this cluster comprises households who derive their living from formal employment in kebele, get transfers in the form of pension and remittance, those who engage in charcoal or fuel selling and traditional brewing of different local drinks. About 15 percent of households live only on non-farm livelihood activities.

A third cluster involves households diversifying their means of living across sectors. This group, according to Ellis and Freeman (2005:5) lead livelihood activities the risks factors of which are different. Thus, they straddle between opportunities than those confined to only one sector like agriculture. Rural households who cultivate crop, raise livestock, and undertake at least one of the non-farm livelihood activities were identified under this cluster. Households which pursue both agricultural livelihood and those activities outside agriculture make up 37.2 percent of the sample.

Table 4.2. Livelihood strategies of sample households

Livelihood strategies of sample households	Agro-ecology			Total (N=215)	χ^2
	Lowland (N=64)	Midland (N=80)	Highland (N=71)		
Agricultural activities only	24(11.2)	35(16.3)	43(20.0)	102 (47.4)	9.66*
Non-farm livelihood activities only	14(6.5)	13(6)	6(2.8)	33(15.3)	
Both agricultural and non-farm activities	26(12.1)	32(14.9)	22(10.2)	80(37.2)	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, **

Significant at $P < 0.05$

Source: Sample survey, 2016

Analysis of Ethiopian Rural Household Survey by Beyene (2008:156) found that more than half of rural households have one or more members participating in activities outside agriculture. The finding of the study at hand thus confirms the notion of heterogeneous livelihood activities pursued by rural households in the study area. Woreda key informants also corroborated the increasing participation of farmers in non-farm livelihood activities beside agriculture.

Livelihood strategies were not even across the kebeles. Cross tabulation in table 4.2 shows that 14.9 percent of respondents deriving their living from both agricultural and non-farm livelihood strategies were in the midland kebele. Derba cement plant is located in this kebele. Highland respondents were

more identified with agriculture while the lowland respondents were noted for their non-farm livelihood. Pearson chi-square was computed to test the existence of association between the distribution of livelihood strategies and agro-ecological settings selected. The result was significant at 5 percent ($p=0.048$). Therefore, agro-ecological conditions and the distribution of livelihood activities that households combine were interrelated. The following discussions address livelihood portfolio and respective activities in detail.

4.2.1. Agricultural livelihood strategies

In the study kebeles, mixed farming is the dominant agricultural activity and includes both crop cultivation and animal husbandry. Small farming is typical of Sululta woreda (SWARDO 2014). Accordingly, 86.8 percent of sample household heads engaged in both crop cultivation and livestock husbandry. Households that raise livestock alone constitute 2.7 percent of the sample. No households in the highland raise livestock alone. Table 4.3 indicates that 10.4 percent of respondents engaged only in crop farming activities. These households either share animal for traction with other households or sharecropped their land for farmers having oxen.

Table 4.3. Agricultural Livelihoods Activities of households

Agricultural Livelihood Activities	Agro-ecology			Total(N=182 ^y)
	Lowland	Midland	Highland	
Crop farming	7(3.8)	7(3.8)	5 (2.7)	19 (10.4)
Livestock raising	3(1.6)	2(1.1)	0(0)	5(2.7)
Both crop farming and livestock raising	40(22.0)	58(31.9)	60(33.0)	158(86.8)

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively,

^yExcluding 33 sample households pursuing only non-farm livelihood activities.

Source: Sample survey, 2016

Farmers in the study area grow variety of crops of which the major ones are barley, wheat, *teff*, maize and sorghum. While crop varieties in the midland and highland kebeles are more or less similar, in

the lowland kebele only four main crops were identified as common cereals: *teff*, sorghum, maize and millet. Though rare, wheat also makes a list of cereals in the lowland.

For identifying crop types and their share of total yearly production, multiple responses table was set. For this particular study, crops produced in 2008 E.C were not included in the computation. Because at a time of this survey (January 29- March 03) some of households in the study area did not thresh all their produce, though most had done. Therefore, computing total production was not possible for 2008 E.C harvest. However, crop produced in 2008 E.C was used in trend analysis of production between the two production years through approximating data.

Though Sululta woreda exhibits bimodal rainfall pattern during autumn (Belg) and summer (Kiremt), annual production frequency is recognized as one time. The average output of crops for sample households was 8.8 quintals. The maximum production was 37 quintals, which was typical of model farmers in the context of study population according SWARDO chairperson. The minimum production was 1.5 quintals while standard deviation for all observation was 5.7.

As depicted by table 4.4, the total number of respondents who produce crop was 177. Teff is the most widely produced crop; 169 (95.4 percent) households produced teff. Land utilization report from the woreda also shows the large proportion of teff production. Teff is dominant in the three agro-ecologies as compared to other crops. On average, households in the study area produced 3 quintals of teff. Wheat is found to be the second most produced crop in the study area; 116 (65.5 percent) households produced 342 quintals. Standard deviation for maize (2.3) is relatively larger than other crops denoting the larger variation among sample households producing maize. Niger seed and millet were least produced crops; they are not staple. In addition to variation in types of crops produced, there was also a difference with regard to crop output between sample kebeles.

Table 4.4. Crop out of sample households

Agro ecologies	Total (N=177 ^y)	Minimum production	Maximum Production	Mean	Std. Dev.	F
Low land	47	2.00	37.00	10.1702	5.7	3.753
Mid land	65	2.00	22.5	9.4154		
Highland	65	1.50	25.00	7.4077		
Major Types of Crops Produced by Household						
Types of crops produced in 2006/07 Meher (in Quintal.)		N=177	Sum	Mean	Std. Deviation	
Teff		169	504.0	2.9	1.9	
Wheat		116	342.5	2.9	2.0	
Barely		25	42.5	1.7	1.1	
Maize		35	119.5	3.4	2.2	
Sorghum		77	264.0	3.4	2.0	
Bean		81	135.5	1.6	0.9	
Niger seed		20	23.0	1.1	0.6	
Chickpea		38	56.5	1.4	0.7	
Millet		6	12.0	2.0	0.8	
Vetch		43	72.5	1.6	0.9	

^y The remaining 38 households were not crop producers (only raise livestock, or non-farm activities)

Source: Sample Survey, 2016

As indicated by table 4.4, the average crop production of lowland agro-ecology was 10.1 quintals. This figure was higher than the midland and highland with an average production of 9.4 and 7.3 quintals respectively. ANOVA test revealed a significant difference between the mean of production of sample household in three kebeles at 5 percent ($P= 0.025$). This shows that agro-ecology is an important factor that conditions the crop production of sample households.

Farmers either intensify other factors of production without changing the size of land under cultivation or expand farmland in order to increase the amount of production. The following sections present the methods households undertake to support their crop production.

Agricultural Intensification and Extensification

Intensifying agriculture involves increased deployment of labor or capital on a given holding, either cultivated land alone, or on cultivated and grazing land, for the purpose of increasing the value of output per hectare' (Tiffen et al. 1994:29). Increased use of natural or artificial fertilizer, improved seeds, animal traction, mechanization, multi-cropping; and changes to the landscape irrigation, or soil conservation measures suggests intensification is occurring (Carswell 1997:3).

Derba Gulalle Baressa and Bacho Kidanemihiret farmers are known for their high fertilizer application, improved seed use and cluster seeding technologies. Secondary data from Sululta woreda indicates, of the total 6925 quintals of fertilizer distributed in 2006/07 E.C, midland and highland sample kebeles used more than 800 quintals each. This accounts for 23 percent of the total fertilizer distributed in the woreda. Improved seed adoption was common in the woreda mainly for those crops growing in the midland and highland: wheat and barley. More than 130 quintals of improved seeds were applied during the same year with wheat sharing the larger proportion (99.5 quintals).

In the sample kebeles, 22 percent of the crop-growing households mentioned the use of fertilizer, improved seed, pesticide and cluster seeding to support crop production. Model farmers are more inclined to use cluster (line) seeding, which is relatively a new method in the area. One maize producer informant from Bacho kidanemihiret commented the relevance of cluster seeding by saying, 'I found that I used to sow my seed for monkey.' This was mainly to signify the difference between traditional seed sowing methods, which involves simply scattering against cluster seeding. The latter has three gains: saves seeds loss, increases production and reduces labor needed on the field as confirmed by extension workers.

Table 4.5. Main method deployed by respondents in supporting crop production

Main method perceived as supporting household crop production	Agro-ecology			Total (N=177)	χ^2
	Lowland (N=47)	Midland (N=65)	Highland (N=65)		
Application of Modern farm inputs	5(2.8)	21(11.9)	13(7.3)	39(22.0)	25.94**
Traditional soil fertility management	3(1.7)	3(1.7)	12(6.8)	18(10.2)	
Increasing labor working on the land	14(7.9)	19(10.7)	16(9.0)	49(27.7)	
Intercropping	3(1.7)	4(2.3)	1(0.6)	8(4.5)	
Expanding previously uncultivated land	17(9.6)	12(6.8)	7(4.0)	36(20.3)	
Crop rotation	5(2.8)	9(5.1)	13(7.3)	27(15.3)	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively,

**significant at $p < 0.05$

Source: Sample survey, 2016

Traditional soil fertility maintenance was also noted as a main activity for households to increase crop productivity from limited land size. Households, whose landholding was small and mostly located around their homestead, use this type of crop supporting activity. The use of natural fertilizer was noted from a 42-year-old farmer from Derba Gulalle Baressa kebele as below.

Majority of my lands are here around my homestead except those I sharecropped-in. Manures of donkeys, sheep, hens and cattle plays a pertinent role in my household's activities to increase crop productivity. Every summer I dig a hole under my fence, collect dung, and manure. In November, I dig it out and disperse on the field. This not only saves me from spending on chemical fertilizer but also keeps increase the productive capacity of my land.

For other respondents, increasing labor per fixed parcel was crucial method of supporting crop production. Households using this approach constitute 28 percent of the crop-producing respondents.

Crop production activities that proceed from land preparation to transporting and storing grains need huge labor. Teff is one of the labor consuming crop varieties. It is more so in the lowland kebele where weeds continually grow, scaring monkeys, birds and other wild animals require more labor.

Intercropping, though not common, is typical of intensive use of land. This involves cultivating variety of crops on the same field in order to maximize the production and variety of crops grown.

In Handa Woizero kebele, cereal crops grown simultaneously include maize, millet and sorghum. Pepper was the most frequently intercropped vegetable with maize. In Bacho Kidanemihiret and Derba Gulalle Baressa, intercropping is not common except for chickpea and vetch. Farmers intercrop these crops mainly to get maximum production without allocating land for them since they are not staple cereals.

Table 4.5 shows that crop rotation is the most frequently used strategy to increase crop production. Of the sample households producing crop, 15.3 percent indicated changing crop grown on the same field from year to year as a means to increase production. This was also confirmed by observations in Handawoizero kebele where farmers burn a stalk of crops like maize and sorghum in order to improve soil fertility for the next production season. Similarly, the midland and highland farmers mix with the soil straws of barely, wheat and bean after having been grazed by cattle in order to make it decay for growing another crop for the next cropping season.

Agricultural intensification can also be more noted from the absence of fallowing system and frequency of cultivation (Creswell 1997). No farmer reported the use of fallowing; all lands allocated for cultivation were used from year to year intensively. Cross tabulation in table 4.5 shows that while the application of modern input was identified with respondents from highland and midland, expanding land for cultivation is common in the lowland.

Association between agro-ecological conditions and approaches employed to increase crop production was significant at 5 percent ($p = 0.004$). As a result, agro-ecology of the respondents and the approach to increase crop production are interdependent. In the same way, Morris et al. (2002) argued that the choice between intensifying and extensifying is a function of agro-ecological potential, access to labor and capital.

An alternative to agricultural intensification is extensification; expansion of cultivation into previously uncultivated land (Creswell 1997:2). Expanding land for cultivation is a widely practiced agricultural activity in the midland and lowland sample kebeles.

As indicated in table 4.5, 29 (16.4 percent) households reported the expansion of farmland as a strategy to increase farm production. Respondents from Handa Woizero constitute 9.6 percent of farmers practicing expansion of farmland to increase production. Farmers in the study area undertake extensification on two fronts: expanding formerly uncultivated forest or shrub land and bringing grassland under cultivation. Regarding the former, a 35-year-old man key informant from Bacho Kidanemihiret kebele said:

I have 1.25 hectares of land with 7 household members. Some proportion of this land was used to serve for pasture that I formerly sell for highland farmers who settle here every summer. My farm size is extremely inadequate to support my household. The fertility level of the soil in our area is poor, mine is not an exception. If I get a good production of sorghum in one year, the next year I need not expect 'that' because it depletes. I do not afford fertilizer. As a result, I started to cultivate my unreachable hills side pastureland after making charcoal from shrubs thereof. I produce crop over there mostly through hoe. Now, only small parcel is left for pasture. If I could not find new areas as such, producing crop and feeding my family would have been impossible.

Woreda agricultural and rural development chairperson stated that farmers in midland and lowland kebeles of the study area cultivate beyond the recommended slope of 25-30 percent. Farmers cultivate land as steep as 35 percent which shows the severity of land shortage in the area. This created a vicious circle of low production and working on marginal farmland. Review of kebele reports attests this interview. For example, in Handawoizero kebele, 1280 hectares of land was identified as cultivable land under recommended slope according to pre-harvest survey of 2014/2015. However, 1331 hectares of land was found to be cultivated; 123 hectares of land which

are not formerly planned was brought under cultivation. Observations also revealed that grazing land is confined along the riversides and streams in highland and midland areas.

Irrigation and Vegetable Gardening

Irrigation and vegetable gardening are also important methods of substantiating annual cereal crop production. From total sample, 51 households indicated that they own land suitable for traditional irrigation while 32 (62.7 percent) households use their land for irrigation. Above half of those practicing irrigation were farmers from lowland agro ecology. Woreda cereal crop development expert asserted the difference in the potential of irrigation and suitability of irrigable land across kebeles selected. Majority of land proportion suitable for irrigation was not used for irrigation according to the interview.

Table 4.6. Practices of irrigation among sample households

Practicing irrigation	Agro-ecology			Total (N=51^y)	χ^2
	Lowland	Midland	Highland		
No	4(7.8)	10(19.6)	5(9.8)	19(37.3)	9.6**
Yes	21(41.2)	8(15.7)	3(5.9)	32(62.7)	
Total	25(49.0)	18(35.3)	8(15.7)	51(100)	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, ^y those households who had reported access to irrigable land, **significant at $p < 0.05$

Source: Sample survey, 2016

In highland and midland kebeles, irrigable land is more likely to be used for producing hay which some households sell to urban areas to generate income. Irrigation in the highlands is not suitable because of steep slope and deep gullies. Whereas in the lowlands, diverting rivers and streams requires less labor and the land is relatively flat making it suitable for irrigation. This can be seen from figure 4.1. Chi-square test also denotes a significant association in practicing irrigation across sample kebeles at 5 percent probability (p-value of 0.008). Therefore, irrigation potential and the practices of irrigation were not even across sample kebeles.

Maize, onion, pepper, banana, sugar cane and cabbage are among important crop types grown through irrigation in the study area. Farmers in Handa Woizero explained that they engaged in irrigation to cope with frequent failure of perennial crops like sorghum and maize. Therefore, irrigation practices have two rounds. The first one is just operated initially and deliberately for getting annual production from irrigation. The second is practiced for coping with crop failure which is a serious concern.

According to the report of Handawoizero kebele, the first round irrigation harvest had been completed with 472 hectares cultivated out of the planned 542 hectares of irrigable land. More than 90 quintals of pepper was obtained in 2006/07 E.C. Farmers got maize production ranging from 15-25 quintals per hectare which is more than the harvest gained from rain dependent annual production.

Since vegetables were sold regularly for local markets, some farmers in Handa Woizero persistently produce vegetables. This was done by planting new seed immediately after harvesting the first production (see 'e' on figure 4.1). Frequent production also enabled farmers to get regular cash that they could deploy to further improvement in farm and non-farm livelihood activities.

A 48 year-old woman model farmer, who pursue multiple livelihood activities, explained the role of irrigation as follows.

It was six years since I started working on irrigation as a supplementary livelihood activity. However, it now becomes my main living after the engagement of which I opened small restaurant in kenteri village. I sell cabbages and onion on local market. This income covers all land rent and labor wage. Hence, production from maize, banana and spices is my profit. I got 27 quintal of maize in first round of 2015. Above all, irrigation addressed my food preference. What would I get if I simply look for the bypassing blessed Mogor River?

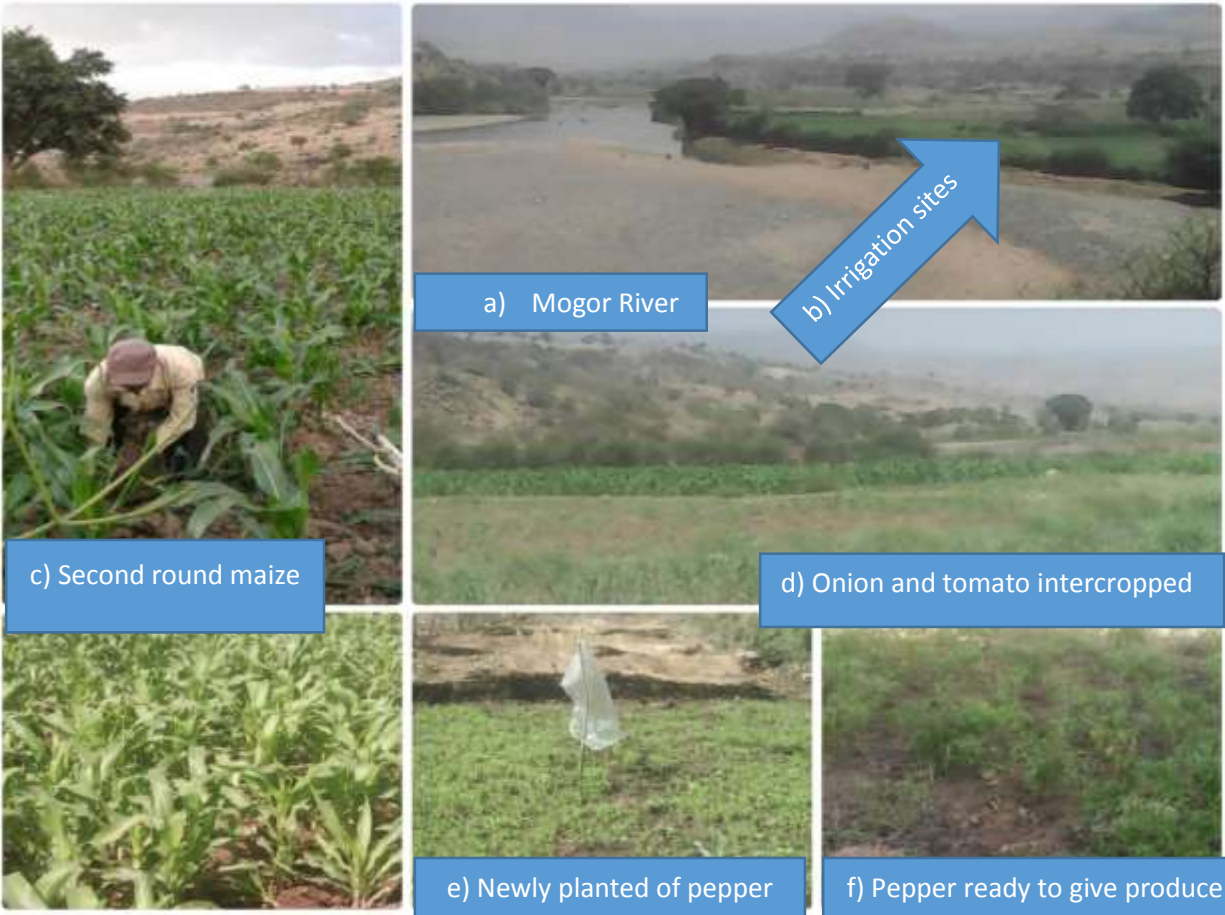


Figure 4.1. A partial view of irrigation practices and different crops grown on Mogor River

Most of the sample households grow hops, as a main ingredient of local drinks; *tella*, *tejj* and *araki*. In addition to retailing in local markets, respondents sell hops on wholesale basis every November. The main buyers of hops are those people who produce local drinks.

Livestock Raising

Livestock husbandry is an integral part of mixed farming and it is an important sector for Sululta woreda. The majority of households in the woreda raise local livestock and milk and milk products are the major income source for farmers (Fekede et al. 2013; SWARDO 2014). Sululta woreda has 19, 9597 TLU. From the sample households, 165 households keep at least one livestock. Overall,

sample households own 1116.8 TLU⁴. The minimum and maximum livestock possession was 0.24TLU and 18.3 TLU respectively. On average, sample households keep 6.77 TLU.

With regard to the distribution of livestock across agro ecologies, Bacho Kidanemihiret had larger livestock holding, 38.6TLU (38.6%) of the total. Farmers in Bacho Kidanemihiret raise livestock which can also be raised only in lowland kebeles like mule and only in highland kebeles like horse. As indicated in table 4.7, the standard deviations of livestock possession are 3.4, 4.4 and 3.8 for lowland, midland and highland agro ecologies respectively. The variation in keeping livestock is minimal among selected kebeles.

Table 4.7. Livestock possession of households

TLU owned by a household	N	Minimum	Maximum	Sum	Mean	Std. Dev
	165	.24	18.3	1116.8	6.7	3.9
Mean TLU owned by sample households						
Kebeles	N=165^a	Minimum	Maximum	Sum	Mean	Std. Dev.
Handa Woizero	43	1.5	17	304.84 (27.3)	7.0	3.4
Bacho Kidanemihiret	62	.50	16	432.01(38.6)	6.9	4.4
Derba Gulalle Baressa	60	.24	18.30	380.03(34.0)	6.3	3.8

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, ^a total households keeping livestock

Source: Sample survey, 2016

Livestock is a substitutable asset that can be sold in order to invest in land or small businesses (Ellis and Freeman 2005:36). From 165 households raising livestock, 97 (58.8 percent) had sold at least one livestock. Farmers who sold livestock stated that food purchase, farm input purchase, medical expenses, saving and business engagement as their main reasons for selling. Households employ various methods to increase the production of livestock. Table 4.8 shows that from the sample households keeping livestock, 108 (65.4) percent reported that they keep local cattle. This group of

⁴ 1Cow/ Ox/Bull= 1TLU, 1 Calf=0.4 TLU, 1Heifer=1TLU, 1 Sheep/Goat=0.10, 1Donkey=0.50 TLU, 1Horse/Mule= 0.80 TLU, and 1Chicken= 0.013 TLU (Freeman, *et al.* (1996)

farmers did not apply any production method than relying on hay from field. One FGD participant woman said, ‘hawaasni keenya umrii isaa guutuu horii gaafa lakkawuu jaallata akkuma abbootiisaa,’ meaning ‘we are counting a head throughout our life as it was used to be so.’

Table 4.8. Main Methods for increasing the production of livestock

Main Methods for increasing the production of livestock	Agro-ecology			Total (N=165)
	Lowland	Midland	Highland	
Keeping local livestock	31(18.8)	51(30.9)	26(15.8)	108(65.4)
Introducing new breeding livestock	4(2.4)	5(3)	16(9.7)	25(15.2)
Fattening and selling	8(4.8)	6(3.6)	18(10.9)	32(19.4)

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, ** significant at $p < 0.05$

Source: Sample survey, 2016

Farming households also introduce new breeding livestock, especially cattle and chickens, in order to augment livestock productivity. This activity characterizes Derba Gulalle Baressa where farmers contract milk for woreda union and town residents. Improved livestock keeping is rare in Bacho Kidanemihiret and Handa woizero; only 2.4 percent and 3 percent of farmers respectively keep improved livestock. Beef farming is another emerging practice of maximizing livestock production in the study area. Households undertaking beef farming constitute 19.4 percent of sample households raising livestock with the highland kebele contributing more than half. The lowland and midland households account for 4.8 and 3.6 percent respectively.

Farmers in the study area also participate in labor employments on the field of others, but within agriculture, in order to earn their livelihood. For Yared (2002:19), activities of these kinds were rare in rural Ethiopia and seasonal in their nature but support the poor segment of rural community.

Seasonal off-farm activities⁵

Both survey and qualitative data revealed the presence of employments in both livestock and crop production activities. Labor employment activities include contract weeding, milking, hay cutting and gathering, crop harvesting, contract farming and keeping livestock of others, among others. These activities are undertaken by 6 percent of the respondents.

Contract weeding is the most common activity for female-headed households. Old households and households with many plots contract their crop for females to remove weeds based on agreement of paying in either food or cash. Farmers whose plots are located on remote areas also contract their plots for the nearby farmers for the purpose of weeding and protection. Contract farming, hay and crop cutting and collection were mainly undertaken by men. In some cases, rural household heads pursue labor employment in areas beyond the locality. In-depth interview revealed that men, who have no own farming, migrate from Handa Woizero to Bale areas during harvesting season in order to generate income. Milking and keeping the livestock of other farmers were also important elements of labor employment.

4.2.2. Non-farm livelihood activities

Increased engagement of rural people in non- agricultural activities is largely becomes a trend (Barrett et al. 2001; Rahut and Scharf; 2012; Haggblade et al. 2010). While farming as basic livelihood absorbs the largest rural labor in SSA, nonfarm income plays a key role in strengthening the potential of smallholder farming as a pathway out of poverty (Loison 2015). Most of these studies consider the participation of rural households in non-farm sectors as a way of diversification.

⁵ A livelihood generating activities that are operated on others farm. It also refers to wage or exchange labors on other farms, and labor payments in kind such as harvest sharing and other non-wage labor contracts.

Of 215 households for this study, 113(52.5 percent) pursue at least one type of non-farm livelihood activities whatever the pattern of engagement be. These were self-employment⁶ and wage employment in various activities. Table 4.9, presents the various non-farm livelihood activities pursued by sample households.

Table 4.9. Non-farm⁷ livelihood activities

Non-farm livelihood activities	N= 113^y	Percentage (%)
Trading activities (retailing, small ruminants, grain, shop)	32	28.3
Unskilled wage employment (laborer, in construction, guards)	57	50.4
Skilled non-farm work like masonry, carpentry, mill operator	33	29.2
Formal employment (kebele manager)	5	4.4
Renting properties (pack animals, house in urban areas, land)	36	31.9
Transfers from parents/children /relatives (remittance, pension)	11	9.7
Brewing/selling local alcohols	45	39.8
Handicraft activities(weaving, pottery, Blacksmith, traditional hair dressing, tailoring)	28	24.8
Fuel wood/charcoal/dung cake and straw selling	16	14.2

^y Households pursuing non-farm livelihood (Multiple responses)

Source: Sample survey, 2016

Wage employment⁸ was the most frequently stated non-agricultural livelihood activity of the study households; table 4.9 indicates that 57 (50.4) households derive their living from unskilled wage. Wage activities include casual labor employment in constructions, in village and employment on privately owned business like fixing houses and fences. Derba cement factory was found to be the main absorber of farmers' labor in Derba Gulalle Baressa and Bacho Kidanemihiret kebeles. Derba Mogor gypsum factory is important in Handa Woizero. Wage activities of respondents in factories

⁶ Self-employment denotes the involvement of household in ones won firm, for instance, in the form of trade, brewing or other self-managed activities. It needs some managerial skills (Woldehana 2000:352; EEA 2009:76).

⁷ All sources of living that are not related to crop production, livestock keeping or labor employment in agriculture.

⁸ A temporary employment activity in which the employer (be individual or corporate) gives order for the employee. In most cases, it needs low skills and capital (Woldehana 2000:54). In the study at hand, classification has been made between skilled and unskilled wage employment following EEA (2009) for their varying underlying determinants.

involve working as guard, loading, assisting in construction, gardening, cleaning, digging ditches and chiseling. According to kebele reports, men were organized in to four groups on loading and arranging cements in Derba cement factory. Each group had a minimum of 46 workers belonging to the three kebeles selected for this study.

Another important wage employment in the area was skilled wage employments. These are masonry, carpentry, and machine operation. In the study area, 29.2 percent of the respondents are engaged in skilled labor employment either in the factory or in private. These activities were more lucrative according to respondents. Formally employed respondent constitutes 4.4 percent of household pursuing non-farm livelihood activities. These were respondents working in kebeles.

As indicated in table 4.9, 28.3 percent of the respondents engaged in different trading activities. Grain trading was mentioned as important for the sample households. Discussants and key informants identified that well to do families purchase grain in rural area and retail for market in towns. Livestock trade between local and town markets was also vital source of income. Petty trading and shopping were also observed. In Kanteri village of Handa Woizero running small shops was common. For Bacho Kidanemihiret kebele, small restaurants and shops surrounding Derba cement are the main trading areas where women sell coffee, drinks and food. Attracted to these businesses, town residents rent house or lease land from rural residents around the factory and engaged in trade. Through renting land, house and livestock, farmers try to meet their financial need. From the sample, 21 percent of them rented their land. Farmland surrounding Derba town is being transferred on lease for residential area. Farmers are gaining large cash from leasing land though this undermines crop production. Renting pack animals and houses was stated by 10.6 percent of total sample. Model farmers also rent large shops and restaurant for good income in towns. Renting donkeys plays an important role for the poor. In Handawoizero and Bacho Kidanemihiret kebeles, transportation by

donkey is an important activity that generates cash income for donkey owners. Those engaged in charcoal production often rent donkey to transport charcoal to towns.

Traditional brewing is crucial home-based non-farm livelihood activity absorbing large labor mainly women. Market observation showed that women sell local drinks along with their petty trade. Though most of the drinks are produced at home, there are important beginnings in Bacho Kidanemihiret kebele where retailing different drinks is undertaken by purchasing it from towns. Such activity was noted by a 49 year-old woman stating as below.

I started traditional brewing under constraint of labor to work in agriculture. My husband is critically sick. We have no child who can farm. As a result, I rented out all plots and engaged in brewing as a main livelihood activity. My donkey transport water for the purpose. I prepare at least six to ten liters of areke within two weeks given that I am healthy and crop prices are stable. I sell one liter of areke for 35 ETB for outside house use, 40ETB if it is retailed at home. Depending on the profit I get, I sometimes also buy areke from others for 30 ETB and retail for 40 from which I secure 10 birr per liter. I have three benefits when I brew areke at home: good income, consistent market and byproducts serving as a fodder to my cattle and donkey. At least once per month, I buy a cassette of beer from Derba town and transport by my donkey than paying transport cost. I get a minimum of 60 birr from a cassette. Special opportunity for my market is the existence of farmers training center a side of my home.

Beyond meeting the cash needs, homemade drink selling encourages saving which is invested on productive resources. In addition to this, it supplements consumption needs of households. From the sample, 40 percent of them are engaged in selling drinks as indicated.

Households in the study area also engaged in making different materials from locally available products. The most widely observed handcraft activities are handwoven traditional materials prepared in the form of, for instance round container for holding food, locally called *Mesob* and dish

like *lemet*. Weaving, tailoring, and traditional hairdressing were other sources of income for households; 28(24.8 percent) households undertake different handicraft activities.

Charcoal production, as asserted by woreda agricultural and rural development chairperson, is the major livelihood activity of farmers residing in lowland and midland kebeles. Some households produce charcoal from trees that have been cleared from their land as a process of expanding agricultural land. There were also households who depend mainly on charcoal production for their livelihood. These groups are the main users of 'Kebele land' which is used by locales communally. They also cut trees for fuel wood. According to extension workers, charcoal production is used as means of generating cash income for farm households.

Though charcoal production is officially banned, people still practice it because of its economic incentive. An interviewee from Handawoizero described the situation when he say, 'poor people cannot quit charcoal production unless they get promising cash generating livelihood. Banning charcoal production is illogical for people who live in misery.' Those engaged in charcoal production indicated that they on average receive 120ETB per a sack of charcoal. Charcoal production, fuel wood, and straw selling are pursued by 14.2 percent of the respondents.

Respondents in this study did not rely only on their labor but also get income from remittance, pension and informal social support. Table 4.9 indicates that 9.7 percent of the respondents secure their living from transfers. The main remitters were children living in towns. The maximum remittance gained in 2014/2015 was computed to be 8500ETB. Farmers reported to deploy cash transfers to purchase farm implements, livestock, pay tax and disburse on food purchase. In-kind contribution of remittance was also mentioned.

4.3. Summary of livelihood strategies

Households in the study area have diverse livelihood strategies. Majority of them, 40.7 percent of respondents, were confined to agricultural living: crop production, livestock raising and labor employment in agriculture. Agricultural intensification was more practiced in highland and midland kebeles. Farmers in Derba Gulalle Baressa and Bacho Kidanemihiret apply more farm inputs like fertilizer, pesticide and undertake traditional soil fertility maintenances. In addition to intensifying agriculture, bringing forestland and grassland under crop production was observed. From the sample, 20.3 percent of them were observed to bring more land (grassland or forestland) under cultivation to increase production.

Irrigation was also vital livelihood activity mainly in Handa Woizero kebele where river discharges is suitable for irrigation. In the sample, 32 households reported to use irrigation. Irrigation products involve not only grains but also vegetables which farmers sell in order to get cash which they invest in other livelihood activities. Farmers integrate crop production with keeping livestock.

Farmers support their farm activities by engaging in non-farm livelihood activities. More than half of respondents, 52.5 percent, undertake different non-farm livelihood activities. Non-farm wage employment and self-employment in trading, local drink selling, handicraft and charcoal production are important components of non-farm livelihood activities for study households. Wage employment in the study area is largely related to job opportunity by Derba cement factory. Trading activities surrounding the factory also result in the inflow of people from Derba town and rent land and house constructed by rural people which become another source of living.

Chapter Five

Determinants of Livelihood Strategies

The previous chapter presented and described the various livelihood activities undertaken by the sample households. Not all rural livelihood activities are available to all households (Stifel 2010; Loison 2015). Differences in idiosyncratic (i.e. household-specific) asset mean that some households are able to surmount difficulties than the other (Ellis and Freeman 2005:20). This chapter emphasizes determinants of livelihood choices. Descriptive statistics was used to identify assets and institutions backing resource access. Five assets depicted by the conceptual framework used in this study were discussed with their respective mediating factors. Multi-nominal logistic regression was employed in explaining the determinants of different livelihood strategies.

5.1. Land: Ownership and Access

Access to land is an important asset for the majority of Ethiopian people who, one way or the other, depend on agricultural production for their income and subsistence. Variation in accessing land is therefore the major determining factor of livelihood activities, income and food security (Samuel 2006; Tsegaye 2012:2). In the study area, access to land takes different forms. As a result, the significance of non-legal means of accessing and owning land are discussed. As presented in table 5.1, from sample household, 14.4 percent had no any access to land.

Of 85.6 percent of households having access to land, 2.7 percent pursue non-farm livelihood. These respondents rented out their land on long-term basis (more than five years) and work as wage laborers or self-employed. Similarly, Devereux (2000:6) found that some rural households of Ethiopia are landless and depend entirely on non-agricultural sources of food and income. The association computed between livelihood strategies and land access was significant at 1 percent ($P < 0.001$). This signifies that accessing land underlies households' choice of livelihood strategies.

Table 5.1.Land Access, holding size and number of Plots

Land access	Livelihood strategies of the respondents			Total (N=215)	χ^2	
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities			
No	0(0)	28 (13)	3(1.4)	31(14.4)	157.2*	
Yes	102(47.4)	5(2.3)	77(35.8)	184(85.6)		
Size of Land holdings						
Land holding	Agricultural activities only (\bar{X} =2.3 hect.)	Non-farm livelihood activities only (\bar{X} =0.79 hect.)	Both agricultural and non-farm activities (\bar{X} =1.4 hect)	Total (N=184 ^a)	χ^2	
0-0.5	10(5.4)	2(1.1)	17(9.2)	29(15.8)	189*	
0.51-1.5	22(12.0)	3(1.6)	35(19.0)	60(32.6)		
1.6-2.5	35(19.0)	0(0.0)	16(8.7)	51(27.7)		
2.6-3.5	17(9.2)	0(0.0)	7(3.8)	24(13.0)		
3.6-4.5	12(6.5)	0(0.0)	1(0.5)	13(7.1)		
4.6-5.5	4(2.2)	0(0.0)	0(0.0)	4(2.2)		
5.6+	2(1.1)	0(0.0)	1(0.5)	3(1.6)		
Total land holding(Hectare)						
N	Minimum	Maximum	Sum	Mean	Std. Dev.	
184	.25	7	345	1.8	1.3	13.38*
Farm plots owned by a household						
Number of farm plots	Agricultural activities only (\bar{X} =4.6)	Non-farm livelihood activities only (\bar{X} =1.6)	Both agricultural and non-farm activities (\bar{X} =3)	Total (N=184)	χ^2	
Less than 2	12(6.5)	4(2.2)	33(17.9)	49(26.6)	30.8*	
3-5	60(32.6)	1(0.5)	34(18.5)	95(51.6)		
More than 5	30(16.3)	0(0.0)	10(5.4)	40(21.7)		
Total number of plots owned						
N	Minimum	Maximum	Sum	Mean	Std. Dev.	F
184	1.00	10.00	722.00	3.9	2	19.28*

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, ^a excluding sample which have no access to land *Significant at p<0.01, ** significant at p<0.05

Source: Sample survey, 2016

Land access is not a sufficient condition for household's decision to choose between alternative livelihoods activities. Size of land holding is another determining factor of livelihood activities mainly in the intensification of smallholder farming systems (Nigatu 2005 as cited in Samuel 2006). Of 184 (85.6) households with access to land, 29(15.7 percent) of them had less than 0.5 hectare or less than 2 *timads*⁹.

Relatively, large holding more characterized households working in agricultural livelihood than those engaged in non-farm livelihood portfolios. The minimum landholding size reported by respondents was 0.25 hectare; 10 (4.7) households had land size of 0.25 hectare. The average land holding of respondents was 1.8 hectares and maximum holding was 7 hectares.

The average size of land holding was 2.3, 0.8, and 1.4 hectares for agricultural, non-farm and combination of agricultural and non-farm livelihood clusters respectively. One-way ANOVA shows significant difference in mean of landholding size among the livelihood strategies at 1 percent ($p < 0.01$). Land scarce respondents were less likely to intensify agriculture. As table 5.1 presents, with increasing land holding size the count of respondents who limit their livelihood to non-farm decline unlike agrarian households.

Smaller average holding in the non-farm livelihood category indicates the necessity reason for choosing activities outside agriculture. The pervasive nature of landlessness and its effects on livelihood choice is described by young landless from Derba Gulalle Baressa: “we, the young generation, lead our life on the good will of land owners. When they ignore us, we straddle between urban and rural works. If I had had land, I would not have been employed in such a dusty and risky business of loading cement.”

⁹ *Timad* is a local unit used to measure land size (one *timad* of land is equivalent to one quarter of a hectare)

An important feature of the landholdings in the study area is fragmentation of plots. More than half, (51.6%), of the respondents had between 3 and 5 plots irrespective of the size of holding. The maximum number of parcels observed was found to be 10, observed in Handa Woizero kebele while the minimum was 1. In-depth interview conducted revealed that households who own only one plots were mainly of two groups; those respondents who got land in the form of inheritance or gift and respondents whose plots had been taken over by cement investment.

The ratio of total land size to total number of farm plots yields a value of 0.47 hectare. In other words, on average, there was 0.47 hectare for every one plot of land. This size of land was considered as low holding and an indication of land fragmentation according to Shumet (2009). More importantly, the ratio of land to persons (sum of landholding size, 345.5 hect/ sum of household size, 1097 persons) for this study was 0.3. There was 0.3 hectare of land for each member of households. This is not adequate to undertake viable farming in the study area.

On average, agrarian households had 4.6 plots of land while the non-farm cluster and combination category had 1.6 and 3 farm plots respectively. ANOVA test showed that the mean difference in plots owned was significant at 1 percent ($p < 0.001$). Thus, households with relatively larger landholding and plots are more likely to intensify agriculture than non-farm activities.

5.1.1. Means of accessing land

Households in the study area get access to land in different forms. These arrangements range from legal ownership to transfers in the form of gift among families. Thus, mixed forms of accessing land were observed in the study area. Table 5.2 indicates that 35 percent of the respondents accessed land by allocation whereas 26.6 percent of respondents through inheritance. In addition to land allocation, and inheritance, landless and land scarce households access land through sharecropping. This is a contract, whereby the land hungry household agreed with landowner to cultivate the land and share

the produce equally. Households who take land on sharecrop have, in most cases, oxen and labor but lack or have small plots of land; 10.3 percent of the respondents accessing land got through sharecropping.

Table 5.2. Forms of accessing land, land fertility, and adequacy

Forms of accessing current farm land	Frequency (N=184)	Percentage (%)
Allocation	65	35.3
Rent/lease	17	9.2
Inheritance	49	26.6
Sharecropping	19	10.3
Allotment plus sharecropping	12	6.5
Inheritance plus sharecropping	16	8.7
Gift	6	3.3
Perceived fertility of farm land soil		
Perception of farm land fertility	Frequency (N=184)	Percentage (%)
Poor fertility	57	31.0
Moderate	111	60.3
Good fertility	16	8.7
Perceived adequacy of land		
Perceived adequacy of land	Frequency (N=184)	Percentage (%)
Extremely inadequate	60	32.6
Inadequate	75	40.7
Adequate	45	24.5
Very adequate	4	2.2

Source: Sample survey, 2016

Land renting is another means of accessing land in the area. Renting is common among financially better-off households. Households whose land has been expropriated predominantly rent-in land as a coping mechanism. Land renting was reported by 9 percent of households accessing land. Gift was observed among 3.3 percent of sample. While 6.5 percent of households accessed their land through both allocation and sharecropping, 8.7 percent added sharecropped land to their inherited land. These arrangements imply that besides legally owning land, socially acknowledged means of getting land plays vital role in undertaking agricultural livelihood.

5.1.2. Perception of land fertility and adequacy

Quality of land is also crucial factor which affects the productive capacity of land hence livelihood activities. Only 8.7 percent of the respondents accessing land indicated that their land, on average, is of good fertility. Large proportion, 111(60.3%), of the respondents said their land is of moderate fertility whereas 31 percent of the respondents labeled their land with poor fertility.

Land fertility level was also indicated on land registration documents of households. In each kebele, land grading committees are established to determine fertility of each plots. It has been three years now since the committee accomplished its task of grading plots. Local elders and agricultural extension workers are the main actors in land grading. Land grading made at the *kebele* level were collected and synthesized to *woreda* land grading criteria that ranges from “A” to “C” representing from productive to poorly productive land. The moderate productive capacity of land was represented by “B”. Land size and productivity trend of the land are main domains of grading.

Adequate land for production is equally important to intensify agriculture. However, in Ethiopia, landholding for most of rural poor is inadequate and hence limits sustainable intensification of agriculture (Samuel 2006). Only 2.2 percent of the sample rated their land ‘very adequate’ and 24.5 percent ‘adequate’ to meet the food needs of their household. As indicated in table 5.2, respondents who perceive their land as ‘extremely scarce’ account for 32.6 percent while 41 percent rated their landholding size as inadequate.

For landless rural poor, communal land is a relief. Charcoal production, fuel wood and hay collection would have not been possible if communal land had not been accessible. The majority of communally used land is found around the hillside areas of lowland and midland kebeles. Farmers of highland areas regularly migrate their cattle to lowland areas every summer (July-September) mainly to escape the heavy rainy season, and to save their pasture to produce hay.

5.2. Physical Assets

Physical assets involve infrastructure and producer goods that are needed to support livelihoods. DFID (1999) enlisted secure shelter, adequate water supply and energy, affordable transport, access to information and tools for production as physical assets. Sample households have at least one detached house. Table 5.3 indicates that 43.3 percent of respondents live in mud wall and grass roofed house, 3.3 percent in house made from grass and the remaining 53.5 percent in house covered by corrugated iron sheet.

Drinking water was identified as the most critical in the study kebeles and the problem was found to be worse in Bacho Kidanemihiret. Some of the sources of water available are not protected.

Table 5.3. Housing, source of water and energy

House type	Frequency (N=215)	Percentage (%)
Grass walled and Grass roofed (Thatch)	7	3.2
Mud wall and grass roofed	93	43.3
Mud walled and galvanized iron roofed	115	53.5
Main source of drinking water	Frequency (N=215)	Percentage (%)
River	88	40.9
Spring/Stream	93	43.3
Traditional well	3	1.4
Ponds	8	3.7
Piped water	23	10.7
Main source of energy for cooking	Frequency (N=215)	Percentage (%)
Fire wood	127	59.1
Animal dung cake and straw	74	34.4
charcoal	9	4.2
Electricity	5	2.3

Source: Sample survey, 2016

Spring water provides water for 43.3 percent of the respondents. Observations made revealed that the majority of the streams are unprotected though there were exemplary groups managing water points. River water supports 40.9 percent of the respondents. Pond water, which is another

unprotected water, is also available and 3.7 percent rely on it. Only 1.4 percent of households dig well water themselves and protect. Pipe water is available for 10.7 percent of the respondents. Two pipe water sources have been constructed by Derba cement and some households can access.

Energy for cooking is another physical asset which affects labor, income, and livelihood activities of households. Firewood is a predominant source of energy in the study area. Fuel wood is relatively more accessible for the lowland residents who have an advantage of using forestland as compared to highland households. Animal dung cake and straw (crop residue) are used as fuel in the highland instead. Electricity is available for a very small proportion of the sample households (2.3 percent of respondents). Charcoal is also another important source of energy.

5.2.1. Possession of productive assets and Tools

For farmers, traction power and tools are an important physical capital. Almost all farmers of the study area use traditional ploughs. Ox is a crucial source of traction power for farmers. Undertaking agricultural tasks requires at least pair of oxen. Those who have only one ox rely on local traditional livestock sharing arrangements such as *humna*. Table 5.4 depicts that 32.1 percent of the respondents had no ox. The majority of the respondents who have no ox work in non-farm livelihood activity. Those having only one ox constitute 12.6 percent of the sample. The maximum ox ownership was 6 while the minimum was 0 (no ox).

Table 5.4. Number of oxen owned by households

Number of ox owned	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
No ox	16(7.4)	32(14.9)	21(9.8)	69(32.1)	77.8*
Only one ox	16(7.4)	1(0.5)	10(4.7)	27(12.6)	
Two and more oxen	70(32.6)	0(0.0)	49 (22.8)	119(55.3)	

Total ox ownership					
N	Minimum	Maximum	Mean	Std. Dev.	F
215	.00	6.00	1.6419	1.45240	32.8*

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively; significant at *Significant at $p < 0.01$.

Source: Sample survey, 2016

Contrary to the finding of Amare and Belayneh (2013:127), ox possession was larger for farming households than households engaged in non-farm livelihoods. Difference in mean of ox ownership was significant at $p < 0.01$. The Result of one-way ANOVA implies that livelihood portfolios identified in this study significantly differ with respect to ox ownership. Not only mean difference exists, the number of ox owned was also significantly associated with livelihood strategies at 1 percent for $\chi^2 = 77.8$ ($P = 0.000$). Hence, agricultural intensification was more likely to be undertaken by households who have more oxen while those with no ox adopt non-farm livelihood activities.

Table 5.5 presents physical assets owned by respondents as generated from multiple response. Grain store was included in physical assets for it protects grain loss and hence contribute to the sustainable consumption of households; 27.4 percent of the respondents' possess traditional grain storage. Mesay (2009) conceived that inappropriate storage facility affects post-harvest loss and affects household food availability. Complying this, extension worker in Handa Woizero kebele pointed out that households sell sorghum and maize in large quantity to escape post-harvest insects' devastation.

Table 5.5. Material possession of households

Items	Frequency (215 ^y)	Percentage (%)
Mobile	54	25.1
Radio	85	39.5
Grain store	59	27.4
Farm tools	165	76.7
Beehive	31	14.4
Carts (of donkey or horse)	6	2.8
Others (water pump, grind mill)	8	3.7

Note: ^ymultiple response (count=Yes) Source: Sample survey, 2016

Beehive was also important for its productivity of honey and supplementing income sources for farmers; 14.4 percent of respondents had beehives. Three types of beehives were identified: traditional, transitional and modern beehives. The difference is mainly in terms of materials used to make it, safety and production capacity.

Carts were locally made vehicles which contribute to livelihoods of respondents: 2.8 percent of respondents own carts. The importance of carts for farmers was noted from a 46-year-old model farmer in Derba Gulalle Baressa. An entrepreneur farmer described the role of carts as below.

I have two carts; one for horse and the other for donkey. Horse cart is mainly used for transportation of people to market and Derba town. I use donkey cart to transport hay, crop residue, water, and construction materials. Donkey cart also help me to transport stone, which I collect from farmland and sometimes mine from hillsides, to Derba town for sell. Particularly on market days, “my cars” are busy of generating cash which I deploy to fertilizer, tax, seed, children education and saving. On average, I get 450 ETB per week of which I save 100 in the form of ekub. In addition, carts help me to bring my union contracted milk every morning near vehicle road and to take back animal fodder to my milk cows every week. I am aspired to purchase three-wheeled vehicle in order to engage more in non-farm activities and support my farm.

One fourth of respondents had mobile phone. For model farmers interviewed, mobile was identified as the main communication tool to surmount geographic barriers in undertaking livelihood activities like trading. Radio is another dominant source of information for rural households. Table 5.5 indicates that 39.5 percent of respondents have radio.

5.2.2. Infrastructures

Access to transportation is among the important factors affecting livelihood activities. It is a critical entry barrier for smallholders to secure relatively good cash from their produce and to widen their choice between activities (Barrett and Reardon 2000). The majority of sample households use pack

animals to transport their products, and visit town on foot. Vehicle transportation was rare and difficult for Handa Woizero kebele. Vehicle transport was typical of households diversifying their livelihood while human labor is vital means of transport for farmers. The association between main means of transportation used by respondents and livelihood clusters was significant at 1 percent ($p < 0.01$). Households having access to vehicle transport had non-farm livelihood opportunities.

Table 5.6. Access to Transportation and Infrastructure

Main means of transport to serve your produce to market	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
Vehicle	16(7.4)	11(5.1)	32(14.9)	59(27.4)	33.02*
Pack animal	59(27.4)	4(1.9)	33(15.3)	96(44.7)	
Human Labor	27(12.6)	18(8.4)	15(7.0)	60(27.9)	
Average distance from infrastructure					
Average distance (Hour)	Livelihood strategies of the respondent			Grand Means	F-values
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
From The nearest water point	1.1	0.6	0.8	.8	6.1**
From the nearest health center	1.5	1.3	1.4	1.5	1.66
To all year motorized road	0.9	0.8	0.7	.8	0.091
From the nearest grind mill	1.6	1.1	1.4	1.4	4.09**
From the nearby town	2.3	2.4	2.4	2.3	1.51

Significant at *Significant at $p < 0.01$, **significant at $p < 0.05$ Source: Sample survey, 2016

Not only are people able to move between rural and urban areas more easily if the transport infrastructure is good, but they are also more likely to be better informed about opportunities available (DFID 1999:13). For the study area, only Derba-Bacho-Mogor road was noted for all year round transport. Rural road networking projects started in the kebeles were left unfinished and road access is becoming a problem especially during rainy seasons. This discourages access to market as stated by model farmers in Bacho Kidanemihiret who sell their livestock, grain and trees in the local

market. Under such conditions farmers exchange their scarce resources for low cash gain which if transported to town market would have resulted in good earning.

As presented in table 5.6, on average, respondents would have to walk an average of 0.9hr to get the nearest water point with a maximum of 1.5 hr observed in the Bacho Kidanemihiret kebele. Average walking hour to water points is larger for farming households. Distance from water points significantly differentiated livelihood strategies. Concurring this, FGD participants indicated that long walking distance to water points coupled with unavailability of water, discouraged engagement in beef farming and adoption of improved cattle. This was confirmed by analysis of one-way ANOVA with F-value of 6.1 which is significant at 5 percent ($p=0.003$). Females suffer most to get their grain milled because they got to town and spend much time there. This has affected the labor allocation across activities as attested by analysis of variance.

With regard to health center, Derba Gulalle Baressa and Handawoizero have their own health center while residents of Bacho Kidanemihiret have to visit Derba town to access health service. Despite the existence of health center in the kebele it was not functional. It was found pressing for the distant development group farmers who have to carry sick member of the household in-group and bring to town. Observation in these development groups also revealed the same result.

5.3. Human Capital: Education, Health and Training

Human capital constitutes the capability of people through which they realize their potential in pursuit of a combination of livelihood they choose to operate (Benette 2010). Human capital is a function of education, training and good health.

Education not only makes labor productive but also widens the opportunities for households to work on activities that are relatively more remunerative. In the study area, the widely available wage

employment for local farmers is work at Derba cement factory, mainly guard and cement loading. A minimum educational requirement for a person to be employed as a guard ranges from grade 4 to 8 grade based on the position and placement for which they are employed. New entrants need either to have experience in other organization or education or have to be trained under the factory itself. As a result, the “uneducated” were either filtered to casual labor in the construction or employed in the less remunerative livelihood activities privately.

The majority of those working on arranging and loading cement are young people who are educated member of the local community. They work in a cooperative. Potential employees are obliged to pay some amount of money for a member who wants to withdraw from cooperatives. This was indicated in FGD as a main entry barrier to non-farm livelihood activities for the uneducated. This finding is different from the study by Woldehanna (2001) who found education as not being the determining factor for rural non-farm livelihood activities.

Rahut et al. (2014) wrote that rural households’ capacity to allocate labor among livelihood activities is determined by household size, structure, age, and dependency ratio.

Table 5.7. Household characteristics and education as proxies of human capital

Means	Livelihood Strategies of the respondent			Grand mean	F
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
Age	50.2	38.7	37.1	43.6	29.8*
Household size	5.03	4.03	5.62	5	8.3*
Number of dependents	2.3	1.4	2.02	2	7.5**
Years of education	1.3	3.2	5.3	3	39.8*
Number of educated HH members	1.8	1.6	2.4	2	6.8**

Note: H = household, *significant $p < 0.01$, ** significant at $p < 0.05$ Source: Sample survey, 2016

As indicated in table 5.7, the average years of schooling of respondents was 3 years while on average sample households had 2 educated members. Larger mean of age was observed in household pursuing agricultural livelihood than those who combine agriculture with non-farm livelihood activities. Households who combine both agriculture and nonagricultural livelihood activities had large family size. Relatively more dependency ratio was observed in households confined to agricultural livelihood.

The difference in mean of maximum years of schooling and average number of educated members per household was found to be significant at $p < 0.01$ and $p < 0.05$ respectively. Averages of proxies of human capital in this study significantly differentiate between livelihood strategies. The magnitude of their effect on livelihood strategies was tested through multinomial regression at the end of this chapter. Adult education is not well known in the study area.

5.3.1. Training and Health Status

In addition to available labor, trainings, and healthy living are important to undertake certain livelihood activity. More than half of the respondents received various trainings while 45.6 percent did not receive any training that helped their livelihood. Table 5.8 presents that out of 117 respondents who received training, 46.2 percent received training to increase farm productivity which are provided by woreda. Preparation of natural fertilizer, soil conservation, crop diversification, planting schedule and harvest loss management were among the training received as synthesized from interview with extension worker, model farmers and survey respondents.

Training delivered by Derba cement factory was a pillar for nonfarm livelihood engagement of respondents. The factory trains local people and recruits them for guards and other positions in the factory. Most of the raw material belts were protected by these trained local residents. This opportunity was more vital for farmers who had previously no activities out of farming.

Table 5.8. Training and Health status of respondents

Received training	Livelihood strategies			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm		
No	57(26.5)	18(8.4)	23(10.7)	98 (45.6)	14.5**
Yes	45 (20.9)	15 (7)	57 (26.5)	117 (54.4)	
Types of trainings received					
Type of training received	Livelihood strategies of the respondent			Total (N=117 ^a)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm		
Non-Farm business	13(11.1)	8(6.8)	19(16.2)	40(34.2)	19.7**
Farm related	28(23.9)	0(0.0)	26(22.2)	54 (46.2)	
Health care and nutrition related	4(3.4)	7(6.0)	12(10.3)	23 (19.7)	
Self-rated health status of the respondent					
Perceived Health status of respondent	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm		
Chronically ill	20(9.3)	7(3.3)	9(4.2)	36(16.7)	6.8 (NS)
Moderately Healthy	42(19.5)	11(5.1)	25(11.6)	78(36.3)	
Healthy	40(18.6)	15(7.0)	46(21.4)	101(47.0)	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, significant at **Significant at $p < 0.05$; ^a households which received any training, NS: not significant
Source: Sample survey, 2016

A 38 year-old leader of guards from Derba Gulalle Baressa indicated the contribution of training provided by cement factory as below.

Before 2011, I had no any skill that supports my agricultural living other than participating in some kebele responsibilities. With the commencement of Derba cement factory, I was recruited as a guard and trained for six month at Senkele. After I worked for two years, I was assigned as shift leader. Now, I earn 3100ETB per month. The training was not only relevant to secure my non-farm employment but also alerted me to examine my time allocation between my agriculture work and that of factory. On break days, I effectively work on my farm.

Health and nutrition trainings were also identified by respondents. Respondents from Handa Woizero kebele argued the indispensability of trainings on malaria prevention which used to claim productive labor. As indicated in table 5.8, 19.7 percent of the respondents received health related trainings. Being trained and livelihood strategies of respondents were significantly associated at $p < 0.05$. In other words, trainings have an implication on the livelihood combinations of respondents through enhancing labor capabilities and opening paths of supportive non-farm employment.

The majority of respondents rated their health situation as good while 16.7 percent indicated their chronic health condition. For the lowland kebele, respondents having malaria were interviewed during survey. Interviewees indicated that withdrawing farming activities and expending large amount of money for treating malaria was common in some development groups of lowland kebele.

5.4. Financial Capital: Credit and Saving

Financial capital, which comprises credit, saving and cash stock, is one of the constraining assets in the rural areas. Cash is the most substitutable of all assets and difficult to secure through financial markets that work sporadically in rural areas (Ellis and Freeman 2005:337). The mean yearly cash income for agricultural, nonfarm and both agricultural and non-farm livelihood clusters, in this stud, was computed to be 9534 ETB, 12384 ETB and 22047 ETB respectively.

5.4.1. Credit Service

Only 28.8 percent of the respondents indicated their access to credit. Table 5.9 depicts that of 62 respondents using credit, 18 percent of them were respondents who combine both agricultural and non-agricultural livelihood. Those households who are confined to agriculture were less likely to access credit. The association between credit utilization and livelihood strategies was found to be significant at 1 percent ($p=0.000$). Hence, livelihood strategies and credit access were interdependent factors. Households whose livelihood activities spur between the agricultural and non-farm sectors

more utilize credit than households in other clusters. This supports the review of Loison (2015) that hold that credit encourages the investment of farmers to augment their farm productivity and widen their participation in non-farm livelihood strategies.

Table 5.9. Access to credit service

Access to credit	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
No	86(40.0)	26(12.1)	41(19.1)	153(71.2)	24.9*
Yes	16(7.4)	7(3.3)	39(18.1)	62(28.8)	
Credit source available for households					
Credit source	Frequency (N=62) ^a		Percentage (%)		
Ekub	25		40.3		
Relatives and friends	19		30.6		
Bank	2		3.2		
Micro Credit institution	23		37.1		
Private lenders	44		71		

^aMultiple response, *significant at $p < 0.01$. *Source*: Sample survey, 2016

The majority of credit users relied on informal credit systems or rotational saving and credit association. In most cases, people in financial need negotiate with local residents, collect *equb*, and take the first draw for themselves based on the agreement of the members. This allows members to finance their activities timely, mainly during farming season where financial need is high. Some 40.3 percent of respondents are supported by *equb*. Relatives and friends are other informal sources of credit for 30.6 percent of the respondents.

Results of key informant interview and FGD show the limited outreach of micro credit institutions. When they exist, micro credit services are limited to kebeles surrounding woreda town. In Derba Gulalle Baressa, irrigation and beef farming have been financed by Oromia Saving and Credit institution (OSCI); 37.1 percent of respondents get credit from OSCI. Only small proportion, 3.2 percent, of the respondents access bank credit.

As indicated in table 5.9, local private lenders are important source of credit for 71 percent of households. These were economically better households who were working on informal business of lending money, grain, fertilizers and seed on interest.

Households who did not use credit indicated different reasons. Of 153 households who did not use credit, only 10.5 percent reported that they did not need credit. This study revealed high credit seeking behavior of households from FGDs and key informant interview, particularly in Bacho Kidanemihiret kebele where non-farm businesses were growing. Respondents reiterated fear of indebtedness as one of the factors for not using credit. Farmers argued the uncertainty of farming business and thus credit is thought to have debt consequence. As a result, they limit their livelihood activity to farming though they were in need of credit to widen their livelihood opportunities. In this regard, Barrett and Reardon (2000:6) found that in absence of credit, smallholders in Africa are typically unable to smooth consumption though they desire.

FGD in Derba Gulalle Baressa revealed that OSCI is group-based credit. Farmers are eligible if they are organized into groups, and assume collective responsibility to pay. However, respondents indicated that the economic activities and return of each farmer is not the same. Hence, in case one member fails to succeed, other members take the duty to return the credit. This is claimed to warn those who want to use credit. This is associated with lack of collateral. For respondents relying on private moneylenders, interest rate was reported to be high.

5.4.2. Saving

Household savings are vital source of startup finance for running multiple livelihood activities (Stifel 2010). Half (49.3 percent) of the respondents save. Respondents who combine agricultural and non-agricultural livelihood activities predominantly use saving. As table 5.10 portrays, the figure of respondents with mixed livelihood activities, which save, is two times more than that of agrarian

respondents. Test of association between using saving and livelihood strategies was significant at 1 percent for Pearson chi-square value of 40.7 (P=0.000). This finding supports Ellis and Freeman (2005:191) who state the higher likelihood of non-farm livelihood strategies among households that belongs to credit and savings groups who can finance agricultural activities.

Table 5.10. Saving practices of respondents

Save	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
No	70(32.6)	21(9.8)	18(8.4)	109(50.7)	40.7*
Yes	32(14.9)	12(5.6)	62(28.8)	106(49.3)	
Means of saving	Frequency (N=106 ^y)		Percentage (%)		
Cash at home	20		18.9		
Bank deposits	35		33.0		
Equb	38		35.8		
Through livestock	13		12.3		

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, significant at *Significant at $p < 0.01$; ^y households which use saving (excludes missing)

Source: Sample survey, 2016

The average saving of respondents was 7892.3 ETB. Like in the case of credit, informal saving practices predominates. Equb was the most frequently stated form of saving; 35.8 of the respondents use equb. Saving through buying small livestock like sheep and goat was common among farmers who were working in factory. Bank deposit and cash saving at home were indicated by 18.9 and 33 percent of the respondents respectively. Some respondents from Bacho Kidanemihiret reported that they use saving with bank inaugurated in Derba Cement factory.

5.5. Social Capital

Social networks are vital for rural livelihoods. Pooling resources, risk sharing, and technology diffusion are among the major contribution of social networks in the farming community (Winters,

Gordillo and Corral 2001). For this particular study, participation in local risk sharing self-help groups was common among which *edir* is dominant. *Edir* is a safety valve for the household. In the study kebeles, compensating lost grain and livestock was the most important risk sharing arrangement. For example, key informant from Bacho Kidanemihiret indicated that residents compensate a farmer who lost cow 3000ETB while for ox it is 5500ETB. Other reciprocal social networks based on groups in the study area reduce drudgery labor on a field and let other active labor a household to participate in other livelihood activities.

Dabo is a self-help system where by households assists for one another on different tasks mainly, farming, weeding, harvesting, and threshing. It is an important support for respondents working in Derba cement factory. Though these farmers spent most of their time on wage employment, *debo* system allows them to maintain also farming activities. Land and livestock sharing were also important aspects of social networks in the area.

In addition to sharecropping and gift, *siso* and *irbo* arrangements exist where the landless rural people get access to land. In the case of the former the person who cultivate the land share two third of the produce. In the case of *irbo*, the cultivator shares three fourth of the produce. This is mainly where the cultivator brings new land under cultivation without the contribution of the landowner. Households also share milk cows and oxen. While the benefit for the owner is just retaining the right to young cows, the host household benefits from all milk and milk products.

The majority of the respondents included in this study rated their attachment with their community as 'good'. Farmers development group, committee and five-peer led group were found to be vital in boundary issue, water drilling, road paving, resource mobilization, conflict resolution, and environmental resource management all of which contribute to maintaining rural livelihoods.

5.6. Rural Market and Agricultural extension as mediating Factors

5.6.1. Rural Market: Access and bottlenecks

Market is one of the most important mediating factors in rural livelihood system whereby households get access to and exchange their resources (Elias and Workineh 2012). Availability of market places, distance from market, and frequency of market visit are used as indicators of market access in this study. The majority of the respondents use town markets. Rural markets are mentioned by respondents from Handa Woizero, Kanteri village. As compared to town market, rural markets have limited commodities. For instance, livestock market is large in the town market. Bacho kidanemihiret kebele had no market of its own at least to buy basic needs, except some shops surrounding factory. Derba Gulalle Baressa kebele have proximity to Derba town than the remaining two kebeles included in this study and thus have access to town market.

Regarding the function and satisfaction with the operation of markets, only 4 percent of the respondents indicated as having no problem. According to a multiple data set indicated in table 5.11, long walking distance was reported by 28 percent of the respondents. It was not surprising for the lowland and midland kebele residents who were obliged to visit town market after an average walking distance of 2 hours. These two kebeles were known for their geographic barrier to visit markets and hence situated far away from their main market. FGD discussants pointed out that long walking hours discourages market visit and hence resource exchange.

Relatively, long walking distance was observed among respondents whose livelihood activities are limited to agriculture as compared to those who engaged in other livelihood portfolio. This could be attributed to the nature of non-farm livelihood activities in the study area: trade, wage employment, and traditional brewing which require market proximity. ANOVA test indicates a significant mean difference of walking distance from market across livelihood strategies at 5 percent ($p=0.002$). This

is in line with the observation made by Rahut et al. (2014), who noted that closer proximity to markets is associated with higher probability that a household engage in non-farm activities.

Table 5.11. Challenges of market access

Challenges with regard to market access				
Challenges	Frequency (N=207^a)		Percentage (%)	
Long walking distance	58		28.0	
High transportation cost	90		43.5	
Price Volatility	135		65.2	
Excessive broker influence	74		35.7	
Lack of periodic information	72		34.8	
Limited choice	110		53.1	
Average distance from the nearest market and frequency of visiting market/week				
Livelihood strategies				
Means	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm	F
Walking distance from market (Hour)	2	1.3	1.3	10.4**

^a excluding those respondents arguing “no problem”, **significant at $p < 0.05$

Source: Sample survey, 2016

Farmers reported huge post-harvest sell to cover tax, fertilizer, land rent and other expenses. During this time, market is with abundance. Hence, farmers claimed that grain and livestock prices are relatively low. However, households buy their needs during the lean seasons, mainly summer, at high price. Such uncertain market environment have substantial transaction costs and likely to pose a barrier to entry for some households into certain activities. This reinforces the finding of Devereux (2000) which states that price volatility undermines resource exchange. Price instability of grains and purchased inputs was mentioned by 65 percent of respondents who argued challenges of market.

Women informants said that powerful merchants purchase grains since they have adequate cash and as a result accessing grains for their traditional drink making has become competitive. Concomitant to this is the influence of brokers. Informal brokers working on land, livestock and grain are other

obstacles for the households to benefit from markets and maintain their livelihood. In most cases, brokers works against the interest of farming households as stated by 36 percent of the respondents.

In addition to this, rural households claimed that lack of timely information on markets and limited choice of local markets pose serious challenges to rural livelihood activities. Limited choices of markets as mentioned by 53 percent of the respondents, has three main aspects: market, price and items. Some geographically and economically privileged farmers access more than rural and nearby town markets. Livestock and grain traders often visit different markets many times per week.

5.6.2. Agricultural Extension and Rural Livelihood

Agricultural extension affects livelihood assets: land, livestock, human capital, and access to technologies. Of farming households, 80.2 percent of them indicated the adoption of at least one service rendered by agricultural extension department. As presented in table 5.12, 20 percent of farmers did not use agricultural extension service. Fertilizer, credit, pesticide, seed, improved livestock are among the main services provided by agricultural extension (see appendix 2.3).

Households are more likely to intensify agricultural livelihood activities and augment their production if extension workers support farmers regularly (Yishak et al. (2014). Of the sample respondents, 13.7 percent had not made any contact with agricultural extension workers at all. While 34.2 percent reported occasional contact with extension workers, those who make contacts sometimes and often times are 36.3 and 15.8 percent respectively. Key informants in Bacho Kidanemihiret mentioned that relatively distant development groups were not even visited despite the prevailing sheep disease in the area. This affirms the assertion of Miyuki (2006) that posit longer distance from centers of extension as a disincentive for farmers' livelihood improvement.

Table 5.12. Access to agricultural extension services

Utilize agricultural extension	Agro ecologies			Total (N=182) ^a
	Lowland	Midland	Highland	
No	14(7.7)	10(5.5)	12(6.6)	36(19.8)
Yes	36(19.8)	57(31.3)	53(29.1)	146 (80.2)
Frequency of contacting agricultural extension worker				
Frequency of contacting workers	Frequency (N=146)		Percentage (%)	
Never	20		13.7	
Rarely	50		34.2	
Sometimes	53		36.3	
Often	23		15.8	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively,

^a excluding 33 respondents whose livelihood activities only non-farm livelihood activities.

Source: Sample survey, 2016

Farmers discussed that both the service and agricultural extension workers are urban biased. Input supply centers are located in urban areas. Male FGD participant from Bacho Kidanemihiret said:

Farming seems a one-season activity for an ‘out siders.’ Though we produce once per year, farming is a cyclical activity whereby we prepare ourselves for other task after harvest. Extension workers are mostly available on the day of distributing fertilizer or a day of group meeting.

This case is contrary to the views of Ellis and Freeman (2005) which recommend the need for extension to distinguish client groups on the basis of livelihood strategies, asset portfolios, and to consider how new technologies would fit each of them. Farmers from Handa Woizero indicated different unmet needs. Farmers working on irrigation mentioned their main concern on improved seed. Some were obliged to buy improved seed from adjacent woreda at high price. Similarly, farmers’ aspiration to introduce improved chicken in order to diversify their livelihood activities has not been realized due to lack of extension support. In addition to irregularity of services, farmers argued that high cost of fertilizer discouraged intensification. The average expenditure of farmers for fertilizer was 1609ETB. Farmers reported to buy fertilizer by selling assets like livestock.

5.7. Discussion of Determinants of livelihood strategies: Multinomial Logistic Regression

Multinomial logistic regression was used to explain the determinants of livelihoods strategies. The reference cluster was “agricultural livelihood only.”

The model result indicates that sex of household head significantly determine the odd ratio of choosing between livelihood portfolios. Females participate in non-farm livelihood activities 28 times more than males. Females sharecropped their land and more engage in non-farm living. Holding other variables constant, female participate in diverse livelihoods 11 more times than confined to agriculture. This is contrary to findings which state that male are more likely to engage in non-farm livelihood activities than females (Amare and Belayneh 2013; Zakaria et al.2015).

Respondents with higher years of schooling were more likely to combine different livelihood activities than limited to agriculture. If other factors remain constant, an increase in one grade in education was found to increase the odd ratio of participating in both farm and non-farm by 1.6 (60%) factor than pursuing only agricultural livelihood. In other words, respondents with higher educational level were less likely to choose agricultural livelihood. This is in line with the findings of (Stifel 2010; Asmah 2011; Yishak et al. 2014; Barrett et al. 2001). Wage employment in the study area demands certain level of education. Maximum years of schooling positively and significantly affect the likelihood of combining farm and non-farm activities at $P < 0.01$.

Age of respondents while not affecting the likelihood of being in non-farm livelihood group, significantly and negatively affects the decision to combine agriculture with non-farm activities. The likelihood of respondents to choose a combination of agricultural and non-farm activities, decreases by a factor of 0.8 (20 percent) for one year increase in age. Hence, older age is identified with agricultural livelihood than combining agriculture with non-farm activities. Older people adapt to the farming business while the relatively younger individuals seek works in non-agricultural sectors.

Table 5.13. Determinants of livelihood strategies

Livelihood strategies (clusters) ^a		B	Std. Error	Wald	df	Sig.	Exp(B)
Non-farm livelihood activities only	Intercept	9.679	3.697	6.853	1	.009	
	Maximum yrs of education	.605	.311	3.793	1	.050**	1.832
	Distance from market	-1.840	.770	5.708	1	.017**	.159
	[Sex of HH=Female]	3.356	1.598	4.409	1	.036**	28.672
	[Sex of HH=Male]	0 ^b	.	.	0	.	.
	Age	.081	.050	2.643	1	.104	1.084
	HH size	-.383	.460	.693	1	.405	.682
	Number of dependents	-.592	.577	1.051	1	.305	.553
	Total land size	-9.586	2.368	16.390	1	.000*	0.001
	Number of market visit	.411	1.129	.132	1	.716	1.508
TLU	-3.757	.972	14.949	1	.000*	.023	
Both agricultural and non-farm activities	Intercept	.286	1.432	.040	1	.842	
	Maximum yrs of education	.482	.122	15.659	1	.000*	1.620
	Distance from market	-1.406	.461	9.328	1	.002**	.245
	[Sex of HH=Female]	2.463	.941	6.851	1	.009**	11.737
	[Sex of HH=Male]	0 ^b	.	.	0	.	.
	Age	-.123	.038	10.274	1	.001*	.884
	HH size	1.184	.294	16.191	1	.000*	3.267
	Number of dependents	-.794	.369	4.636	1	.031**	.452
	Total land size	-1.065	.345	9.544	1	.002**	.345
	Number of market visit	1.819	.656	7.686	1	.006**	6.163
TLU	-.162	.094	2.998	1	.083	.851	

a. The reference category is: Agricultural activities only. b. This parameter is set to zero because it is redundant.

*significant at $p < 0.01$, ** significant at $p < 0.05$,

Source: Sample survey, 2016

Households with larger members were more likely to combine their agricultural living with non-farm activities by a factor of 3.2, holding other variables constant. In other words, households having large labor tend to combine different livelihood activities. This confirms previous studies that found diversification as necessity driven whereby surplus labor in agriculture is allocated to non-farm activities due to the small land plots to work on (Yishak et al.2014). Small landholding in agricultural livelihood caused disguised unemployment which pushes active labor to non-farm sectors.

However, the existence of dependent members constrains households' ability to support their agricultural living (Asmah 2011; Ellis and Freeman 2005; Rahut et al.2014). Complying these studies, the likelihood of households to pursue both farm and non-farm livelihood activities than agriculture decreases by a factor of 0.4 (60 percent). In other words, an increase in one dependent member decreases the likelihood of households to choose multiple livelihood activities by 60 percent because dependent members were not sought in the labor market. As a result, households with large dependent members maintain agriculture than widening non-farm options.

Distance from market negatively affects decision to engage in non-farm livelihood activities. A unit increase in distance from market decreases the likelihood of engaging in non-farm activities by 0.159 (84 percent) and engagement in both agricultural and non-farm livelihood activities by a factor of 0.24 (76 percent). Distance from market increases transaction cost, and limit opportunity to resource exchange and thus limit households in to agricultural livelihood (Amare and Belayneh 2013; Elias and Nigatu 2012). Attesting this, frequency of market visit was found to foster households' decision to combine agricultural and non-farm by a factor of 6 and was significant at $p < 0.05$. Frequent access of market instigates households to broaden their portfolio.

Land size was significantly and negatively associated with participation in non-farm livelihood activities. An increase in size of landholdings decreases the likelihood of engaging in multiple livelihood activities by a factor of 0.34. Stating differently, large holding was typical of agrarian households as compared to those who pursue rural non-farm. Thus, non-farm activities are the function of distress factors like smallholding and large family in Ethiopia (Bereket and Zenebe 2011; Loison 2015).

Households having large TLU intensify agriculture more than non-farm activities. Increase in TLU decreases the likelihood of choosing non-farm livelihood by a factor of 0.023. Similarly, it decreases

the likelihood of running diverse livelihood activities by a factor of 0.851 percent than agriculture alone. Income generated from livestock helps farmers to fulfill family requirement including food (Yishak et al.2015:100). As a result, households who own large livestock unit were more characterized by their agricultural livelihood than non-farm livelihood strategies.

5.8. Summary of determinants of livelihood strategies

Livelihood strategies are the function of assets and institutions that facilitates the access to resources. Five assets depicted by the conceptual framework were described in this study. The Majority of respondents have access to land while 14.4 percent had no any land. The average landholding was 1.8 hectare; 4.7 percent of respondents had 0.25 hectare of land. On average one plots is 0.47 hectare. This indicates land fragmentation in the study area. Majority of respondents, 114 (67%), had at least one oxen. Some 41 percent of the respondents get their water primarily from river while firewood is their main source of energy. Productive tools like beehive and carts were observed to support the livelihood making activities of respondents; 14.4 percent and 2.8 percent of respondents had beehives and carts of different types respectively.

With respect to training, 54.4 percent of the respondents received training related to farm, non-farm business and health. Using credit was not common among respondents; only 28.8 percent of them use credit service and the majority of the credit users rely on informal credit system. Fear of indebtedness was the main factor undermining credit use. Informal social networks were also found to affect the access to resources like land, livestock and labor which in turn influence livelihoods. Multinomial logistic regression revealed that landholding size, number of livestock, distance from market, frequency of visiting market, educational level of respondents, number of educated members in the household, household size and number of dependents determine the choice of livelihood strategies of respondents.

Chapter Six

Challenges Facing Small Holder Farmers

This chapter of the study deals with the contexts under which smallholders operate their livelihood activities. Accordingly, trends of resources; land, labor, and production are discussed. Since livestock related challenges were addressed at different points in the previous chapters, crop production is focused in this chapter. More important, however, are the impacts of Derba cement factory on the livelihood of smallholders. The chapter also describes the household food security situation and explains its linkages with livelihood strategies discussed in chapter one.

6.1. Trends and Challenges of Crop Production

Trends in crop productivity were identified from the perception of respondents and review of secondary data. Of sample households who produce crops, half of them 91 (51.4 percent) reported decreasing crop production over time. Those who indicated their production is increasing over time were 30 percent of the respondents. The remaining 18.6 percent argued that their production did not show any change. Similar to cross tabulation made for the study kebeles and crop production in chapter one, households' perception of crop productivity over time is compared among the three agro ecologies selected in table 6.1.

Table 6.1. Trend of crop production of respondents

Trends of crop productivity	Agro-ecology			Total (N=177)	χ^2
	Lowland	Midland	Highland		
Increasing	13(7.3)	24(13.6)	16(9.0)	53(30)	10.5**
Decreasing	27(15.3)	23(13.0)	41(23.2)	91(51.4)	
Almost the same	8(4.5)	17(9.6)	8(4.5)	33(18.6)	

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively

** significant at $p < 0.05$

Source: Sample survey, 2016

The majority of households who indicated that their crop production has decreased belong to lowland, and highland kebeles. The association between the trend of crop production and agro-ecology was found to be significant at $p < 0.05$ ($p = 0.032$). Thus, it is not only the production capacity but also the trend of crop production varies across study kebeles.

6.1.1. Reasons for the dwindling of crop production

Wagayehu (2004:193) asserted that priority rankings of agricultural problems differ as a function of farmers' resource endowments and socioeconomic circumstances. In the study at hand, households were asked to indicate the main reason for the fall of their crop productivity. In doing so, multiple response was set for 91 households, those who said their production decreased. Survey and FGDs produced different factors underpinning the decline in crop production.

As table 6.2 depicts, pests and diseases were reported by 35.2 percent of the respondents as a major problem of crop productivity. Respondents from Derba Gulalle Baressa are more likely to face the problems of pests and diseases than the other two kebeles. Agricultural extension worker stated that wheat and barley are the most widely affected cereals. Farmers conceived the ineffectiveness of pesticides and loss of produce overtime. Woreda cereal crop development expert also agreed the unequal pace of crop disease spread and supply of pesticides. Similarly, the spread of rodents devastating stalk crops was reported in Handa Woizero kebele.

Land degradation is another pressing issue affecting crop productivity. Respondents associated this with the geographic setting, and intensity of rainfall. The majority of the farmlands of the study area are located at the edge of hillsides. Woreda agricultural and rural development chairperson also reported the severity of sheet erosion in the area that accelerates continual dwindling of produce over time mainly in Handa Woizero and Bacho Kidanemihiret kebele. The proportion of households who

reported land degradation was 45.1 percent. Insufficient holding and continuing land fragmentation were also noted to result in the decreasing trend of crop production.

Table 6.2. Reasons for decreasing crop productivity

Reasons for decrease in crop productivity	Lowland	Midland	Highland	Total (N=91^y)
Pests and disease	7	9	16	32(35.2)
Land degradation	11	13	17	41(45.1)
Insufficient landholding	8	10	19	37(40.7)
Declining application of farm implements	4	12	15	31(34.1)
Erratic rain fall pattern	32	19	28	79(86.8)
Lack of labor	5	2	23	30(33)
Lack of Oxen	6	4	15	25(27.5)

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively,

^ymultiple responses *Source:* Sample survey, 2016

In rural Ethiopia, soil fertility, already very low, is declining due to intensive cultivation and limited application of yield enhancing inputs (Devereux 2000:1). Attributed high cost and irregularity of agricultural extension service, some sample farmers gradually apply less modern inputs. This caused production decline as reported by 34 percent of farming respondents. Such condition was underscored in areas which had been applying fertilizer, improved seed, and pesticide but quit using them.

Erratic rainfall pattern is the most frequently reported factor behind the deterioration of crop production in the study area. This works in two main forms as synthesized from in-depth interview and FGDs. The first is through distorting cropping schedule. Farmers cannot cultivate crop they need. FGD participant farmer from Derba Gulalle Baressa stated the ramification of distorted rainfall pattern as follows.

I had started preparing my land for growing red sorghum early April 2015. This was used to be the regular time of starting the work for red sorghum. After I had farmed the

land for two times I sowed it at the end of April. At a time, the cloud was seemingly rain bringing. There was a rain for the first two weeks of sowing and immediately quit while the crop starts to grow. A grown sorghum dried and entailed me a burden of preparing land for wheat. No rain again, until the beginning of July, which is a time for Teff. Due to lack of choice, I sowed teff to dry land.

Extension worker from Derba Gulalle Baressa kebele reported that 94 hectares of land had been prepared for sorghum but transferred for other crop like chickpea and vetch which grow during spring (September- November). Coinciding this report, 67 percent of the respondents indicated that they give up sowing crop types they want due to delay of rainfall. The second effect of rain is its crop devastation. The devastation of bean by snow was the most pervasive impact reported by farmers and woreda cereal crop development expert. The reduction in the production of bean was estimated to 15 percent at woreda level in 2014/15 due to snow rain. Overall, the production of crops was reduced by 4.8 percent according to woreda reports.

Crop failure is more pressing in the Handa Wooizero kebele where crop varieties are only four; maize, *teff*, sorghum (Gray and white), and Millet. Hence, the probability of substituting other crops immediately after the failure of the other, as in the case of Derba Gulalle Baressa, is very limited. For some respondents, crop failure caused by rain posed latent effects like indebtedness as stated by a victim farmer when she say, “ I could not get even a kilogram of sorghum from 1.5 hectare land over which I had sown 50kg, in 2015. This left me with a debt of land rent, seed and labor expenses. The worst year of food shortage is yet to come.”

Lack of labor also decreases the production of crops as stated by 33 percent of respondents. Sick, old, female household heads cannot farm and this affects crop production. FGDs however explored more critical factor for labor shortage, labor withdrawal from agriculture. The conception of discussants and key informants from woreda concurred with regard to surging labor withdrawal from

agriculture even in a situation where there is no job opportunity in the non-farm activities. Lack of oxen as a cause of crop production decline was reported by 27 percent of the respondents.

6.1.2. Effects of Derba Cement on farming households

In addition to factors mentioned in preceding section, cement investment in the area affects food production through diverting farmland to non-farm sector. Table 6.3 shows that 41.4 percent of the respondents were affected by cement factory while 58.6 percent of them reported that cement investment did not affect them. The majority of the respondents who are affected by cement factory are from Handa Woizero Kebele. This kebele is a quarry site for Derba cement factory where extensive land is used for gypsum extraction and expanding over time according to FGD participants and observation at different times. The plant site is Bacho Kidanemihiret kebele which was formerly farm and pasture land. Derba Gulalle kebele is a route from woreda town to the plant site.

Table 6.3. Effects of Derba Cement factory on farming households

Are you affected by cement factory?	Kebeles			Total (N=215)
	Handa Woizero	Bacho Kidanemihiret	Derba Gulalle Baressa	
No	28(13.0)	45(20.9)	53(24.7)	126(58.6)
Yes	38(17.7)	33(15.3)	18(8.4)	89(41.4)
Effects of Derba Cement Factory ^a	Kebeles			Total (N=89) ^y
	Handa Woizero	Bacho Kidanemihiret	Derba Gulalle Baressa	
Took farm land	16	31	12	59(66.3)
Displacement	6	3	5	14(15.7)
Took water points	9	14	7	30(33.7)
Took pasture land	11	19	9	39(43.8)
Dynamite devastation	17	5	0	22(24.7)
Polluted water	9	7	3	19(21.3)
Flooding to farm land	15	6	14	35(31)
Total land lost (Hectares)				
Land taken by cement factory (in Hectare)	25	58	4.2	87.2

Note: Numbers outside and inside the parenthesis represent count and percentage, of total, respectively, , ^a multiple response for households affected by Derba Cement, ^y households affected by factory

Source: Sample survey, 2016

MoFED (2005:10) stipulates that agricultural development be undertaken by private investors in lowland areas where abundant extensive land exists. This is built on the basic premise of forward and backward linkage between the primary (agricultural sector) and the manufacturing sector. The case of the study area was found to be odd. Farmers had no any circulating produce that may feed the factory except their labor. The factory, in turn, had no output that could be deployed by farmers to enhance their productivity.

Though there were different promises like establishment of milk cooperative, credit service and provision of electricity during the commencement of the cement factory, little has been met according to key informants who lost land. Rather the factory is claimed to have some critical consequences on the livelihood of farmers, mainly on those who cannot engage in non-farm businesses. Some of them are discussed below.

I. Farm Land Expropriation

Expropriating land is the most frequently stated effects of Derba cement factory; 66.3 percent of respondents indicated they had lost their land. According to key informant interview, farmers started losing their land for cement investment since 2006. FGD participants in Bacho Kidanemihiret reported that more than 114 households lost their land. Changes in landholding affected not only the ability of the households to produce food but also disturbed the employment and livelihood activities of farmers. The consequence of losing land is more severe for those households who totally lost their land. This was stated by an elder aged 77 from Bacho Kidanemihiret kebele when he says:

I had had more than 22 timads of land before ten years. I used to produce over 50 quintals of grains a year till I lost my land. I had had more than 25 cattle and 5 equine. I used to

employ labor on my farm and livestock. It was since 2007 that I lost half of my land and the remaining in 2010. Now, I have no any farmland to count on. As a result, I gradually sold out my livestock and end up in contracting land with what I have been compensated. I am forced to wait for the hand of my grandson. All my statuses had been washed and I am restricted to looking after one cow which supports my household with milk. I cannot engage in other livelihood activities. I am wrestling untold misery which I never expected.

Beyond affecting the livelihood of households, frequent land expropriation invokes tenure insecurity which further constrained the sustainable utilization of land. Key informant interview revealed that farmers lost their land on different rounds. The first was during the commencement of the factory where majority of the Bacho Kidanemihiret and Derba Gulalle Baressa kebele residents lost their land. The second was during the expansion of factory, construction of belt to the quarry area and road. Frequent land acquisition was found to affect the motive of investing on land according to respondents. There were respondents who mentioned that their land was surveyed, at a time of fieldwork for this study, to be taken for expanding quarry area in Handa Woizero kebele.

As presented in table 6.3, on average, sample households lost 1.3 hectares with a maximum of 5.5 hectares in Bacho Kidanemihiret kebele. Households lost a total of 87.2 hectares with 25, 58 and 4 hectares in Handa Woizero, Bacho Kidanemihiret and Derba Gulalle Baressa kebeles respectively. The total hectare of land lost by the sample respondents was 28 percent of the total land size that the factory proposed to take, 310.4 hectares (DMC 2008).

II. Extractions affected water points and forests

Effects of extraction extend to degrade the natural base and destroy water points that would support large number of household. It was noted from observation that two main water streams of Bacho Kidanemihiret kebele were fenced by the factory. Farmers indicated that these water points were used to be the main sources of water for their household consumption and livestock. Moreover, small

streams were devastated by the road development and stone extraction. Swampy areas which are other sources of water were filled with sand sediment. This forced livestock to travel over long distance to get water from river. In addition to this, dusts and greases from quarry area were observed to become the most critical polluting factors of the water sources.

For those who were forest dependent for charcoal, timber, fuel wood and hay, dynamite explosion makes the access difficult. Forests and trucks to access them were destroyed. As table 6.3 shows, of the respondents who were affected by cement factory, 24.7 percent argued the impact on natural resource. Dynamite explosion at quarry area created massive stone and soil sediments which flow to the field of farmers every rainy season and destroy crops annually. Extractions were also causing flood to farmland. Households who are working on irrigation in Handa Woizero reported that land for irrigation is decreasing overtime due to flooding caused by quarry. Quarry area creates gully that leads flood to the irrigation fields which erode it to Muger River.

III. Displacement

Deteriorating landholding and the potential expansion of quarry area were indicated as the main factor for the out flow of Handa Woizero kebele households to Derba town and Bacho Kidanemihiret kebele. Table 6.3 indicates that 15.7 percent of respondents were displaced. Though the impact assessment of the factory, (DMC 2008), does not indicate the probability of totally losing land, there were households who lost their land and migrated. A 43 year-old woman who was displaced from Handa Woizero and settled in Bacho Kidanemihiret described the process of displacement, livelihood adjustment and consequences on her households as follows.

We lost 3.5 hectares of land and compensated 450,000 ETB in 2007. Since we had no adequate farmland left, my husband started to farm on rented land. Yet after two years, we were again told that our land is needed for quarry area. It was during this time we

chose Bacho as our destiny. All our living remained compensation for three years until we established grind mill. However, we could not manage it properly and thus fail to get profit. We sold it out. We now finished our compensation and my husband is working on casual labor. Even, we have no neighbors to count on here. Maintaining consumption becomes hard and always reminds me the past life at my place of origin, Handa Woizero.

Displaced households were facing challenges on three main grounds. The first one is losing productive land. Secondly, farmers feel livelihood maladjustment once they leave their more familiar livelihood activity, farming. Finally, farmers end up in less remunerative livelihood activities.

6.2. Household Food Security Situation: Implication of livelihood strategies

This subsection presents the relationship between the livelihood combinations of households and the impact of these livelihood strategies in achieving one of the crucial livelihood outcomes, household food security. Devereux et al. (2004:4) pointed out that if certain livelihood groups are identified as being at above average risk of food insecurity, the explanation frequently lies in the low return or high vulnerability of the livelihood activity being pursued.

6.2.1. Source of household food and adequacy

People's livelihood sources conditions their ability to acquire food (Fashogbon and Oni 2012). Production, own labor, trade and transfer entitlements are the main means of acquiring food. In the study at hand, own farm production is a main source of food for 69.3 percent of the respondents; 39.5 percent of those who get food through own production are those whose livelihood was mainly agriculture. Households who engaged in both agricultural and non-farm livelihood activities constitute 29.8 of households who obtain their food from own production.

Not all households get their food from own production. If households cannot produce enough food of their own, its income level and food availability in the market determines their food entitlement. Purchase from market is the main source of food for 28.4 percent of households in this study. The

majority of market dependent households were landless rural households who derive their living mainly from non-farm employment. However, households who are dominantly agrarian themselves were found to be market dependent since annual production could not support their year round consumption. This confirms the finding of Baiphethi and Jacobs (2009:2) which states the increasing dependence of farmers on food purchase like urban residents.

Table 6.4. Main source of food of the household

Source of food	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
Own production	85(39.5)	0(0.0)	64(29.8)	149(69.3)	88.9*
Purchase	16(7.4)	31(14.4)	14(6.5)	61(28.4)	
Work for Food	2(0.9)	1(0.5)	2(0.9)	5 (2.3)	
Adequacy of food stock throughout the year					
Adequacy of food stock throughout the year	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
No	70(32.6)	28(13.0)	42(19.5)	140(65.1)	11.8**
Yes	32(14.9)	5(2.3)	38(17.7)	75(34.9)	
Number of month (s) of food adequacy					
On average, for how many months does your food stock support consumption during a year?	Livelihood strategies of the respondent			Grand mean	F
	Agricultural activities only	Non-farm livelihood activities only	Both agricultural and non-farm activities		
	8.8	4	10.5	8	42.8*

*significant at $p < 0.01$, ** significant at $p < 0.05$

Source: Sample survey, 2016

Food purchase was the largest expenditure for 98 (45.6 percent) respondents. For Gathiaka and Muriithi (2013:7), larger expenditure on food is an indicator of vulnerability to food insecurity. Table 6.4 indicates that 2.3 percent of the respondents get food through their labor. These households get

food in return for labor employment in agriculture. Transfer from relatives was also observed but it was not stated as the main source of food for respondents. Pearson Chi-square attested significant association between livelihood activities and source of food at 1 percent ($p=0.000$).

According to the working conceptualization of food security of FAO (2009), for a food security to be achieved, available food must be adequate at all point in time and address the dietary needs of the unit of analysis, in the study at hand a household. While 65 percent of the respondents indicated the inadequacy of their food stock over 12 months, the remaining 35 percent said it is adequate.

The majority of respondents who indicated the inadequacy of food throughout the year were farming households, accounting for 32.6 percent. This confirms with the report of FAO, WFP, and IFAD (2014) which identifies smallholder farmers as the main producers of food in developing nations while they remain the major food insecure groups over the world. In Ethiopia, too, Tsegaye (2012:2) asserted that food insecurity is a pervasive problem for food producers themselves. As shown in table 6.4, relatively, households who combine agricultural and non-farm livelihood activities were more likely to support their year round consumption than those who are pursuing only agricultural activities. The association between year round food adequacy and livelihood combination of households was significant at $p<0.05$.

The average number of months for which own food stock support household consumption was also higher for households who combine both agricultural and non-farm livelihood activities as compared to non-farm or agricultural alone. This converged the assertion of key informants who conceived cash gained from non-farm activities as a decisive gap filler for food acquirement during food shortage season. As a result, cash income from non-farm activities serves two main purposes: rescuing grain sell by covering expenses for which farmers sell their crop and entitling household to acquire food to fill the gap of food inadequacy through purchase.

On average, households whose livelihood activities are confined to agriculture support their household consumption for 9 months while the figure is 4 months for groups which undertake only non-farm livelihood activities. Larger mean of months of food adequacy was identified with households whose livelihood activities are diversified. ANOVA test shows a significant difference in mean months of food adequacy across livelihood portfolio at $p < 0.01$.

6.2.2. Household Food Access Security

Household food security was measured by household food (in) security access scale (HFIAS). Anxiety and uncertainty about food supply, limited variety of food, and insufficient food intake are the main components of the instrument. Based on the experience of each of these components, households were classified as food secure, mildly food insecure, moderately food insecure and severely food insecure.

Table 6.5. Level of household food insecurity (HFIAS)

Level of household food insecurity	Livelihood strategies of the respondent			Total (N=215)	χ^2
	Agricultural activities only	Non-farm activities	Both agricultural and non-farm		
Severely food insecure	8(3.7)	16(7.4)	4(1.9)	28(13.0)	68.8*
Moderately food insecure	31(14.4)	6(2.8)	5(2.3)	42(19.5)	
Mildly food insecure	30(14.0)	6(2.8)	21(9.8)	57(26.5)	
Food secure	33(15.3)	5(2.3)	50(23.3)	88(41)	
Average HFIAS Score					
Mean HFIAS score	Agricultural activities	Non-farm activities	Both agricultural and non-farm	Grand mean	F
	6.4	9.5	3.4	6.4	30.2*

Source: Sample survey, 2016

A food secure households experience none of the food insecurity (access) conditions, or just experiences 'worry', but rarely. Table 6.5 shows that 41 percent of samples were food secure; 23.3 percent of food secure belongs to households that combine agricultural and non-farm livelihood activities. Only 2.3 percent of food secure households pursue only non-farm livelihood activities.

Households which worry about having adequate food and consume monotonous diet are regarded as mildly food insecure. These households do not get food of their preference, eat limited variety of food and where exists, monotonous types. Farmers asserted that food preference was not a priority for the majority of rural areas. FGD participants indicated that food types beyond local grains are not common, even among the well to do families. This confirmed the findings of the pre-test data. During pretest, food preference like meat was identified with “betterment”.

Table 6.5 portrays that mildly food insecure is the second largest category accounting 26.5 percent of households. The majority, 14 percent, of the mildly foods insecure respondents were farming households. Hence, the survey output supports the interview data that agrarian households could not consume preferred food due to lack of resources to acquire them. Cash and physical means to acquire food are the major constraints of food acquisition for study households.

In addition to worrying about food availability and compromising food preference, households in the study area also cut back on their quantity of food: size of meals and number meals. These households are moderately food insecure and their severity of food insecurity is higher than food secure and moderately food insecure but less than severely food insecure. This category constitutes 19.5 percent of the respondents.

Severely food insecure are those households who provided an affirmative responses to the either of the last three occurrence questions of the scale (see appendix I section 5). Households in this category experience inadequate food intake due to lack of resources that enable them to command food they need to maintain their consumption. Of the total sample in this study, 28 (13 percent) households reported their severe food insecurity situation for the reference period of survey. The majority of the severely food insecure households pursue only non-farm livelihood activities. These households have no food supply from own production and their food entitlement fluctuates between the

availability of activities from which they secure cash to buy food. Similarly, Patel et al. (2015) found that rural households, which were primarily engaged in non-farm labor have lowest wellbeing index among all household types despite their higher cash as compared to farmers.

Interviews also revealed that severely food insecure households disburse much of their income on food purchase. However, since their income was not adequate to purchase food of the needed quantity, cutting food consumption was noticed from their reaction to scale questions. The proportion of severely food insecure farmer respondents was 3.7 percent while households who combine both agricultural and non-farm livelihood activities were only 1.9 percent.

With increasing severity of food insecurity, the number of households engaged in only non-farm livelihood activities increases. In contrast, for households who combine both agricultural and non-farm livelihood strategies the figure gently falls from food secure to severely food insecure category. A Pearson chi-square test for association ($\chi^2 = 68.8$) indicates the interdependence of households' level of food security and their livelihood combinations. The association was significant at ($p < 0.01$).

The maximum HFIAS score was 17 and the minimum was 0. Average HFIAS was 6.4. Higher HFIAS score was recorded in the non-farm only categories while the minimum was in households whose livelihood portfolio involves both agricultural and non-farm activities. Higher HFIAS score denotes more food insecurity while the smaller is a representation of lesser food insecurity situation. Stating differently, smaller HFIAS score is an indication of food security. Larger mean of HFIAS was observed in non-farm category while smaller mean was observed from households undertaking a combination of livelihood activities. Means of HFIAS score significantly differ with respect to the three livelihood portfolio at 1 percent ($p = 0.000$). Hence, livelihood strategies of the respondents were confirmed to underpin household food security.

6.2.3. Dimension of effect of livelihood portfolio on Household food security

Chi-square test attested the existence of significant association between different livelihood portfolio and household food security at $p=0.000$. Test of mean difference in HFIAS score was also significant at 1 percent ($P<0.01$). Contingent up on this, multinomial logistic regression was used to further explain the relationship between livelihood portfolio and household food security situation, holding the ‘food secure’ households as a base category in the regression analysis.

Table 6.6. Livelihood strategies and household food security

Level of household food insecurity ^a		B	Std. Error	Wald	df	Sig.	Exp(B)
Severely food insecure	Intercept	-2.526	.520	23.627	1	.000	
	[Agriculture only=1.00]	1.109	.652	2.890	1	.089	3.030
	[Non-farm only =2.00]	3.689	.730	25.555	1	.000*	40.000
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.
Moderately food insecure	Intercept	-2.303	.469	24.100	1	.000*	
	[Agriculture only=1.00]	2.240	.532	17.759	1	.000*	9.394
	[Non-farm only =2.00]	2.485	.766	10.525	1	.001**	12.000
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.
Mildly food insecure	Intercept	-.868	.260	11.129	1	.001	
	[Agriculture only=1.00]	.772	.362	4.543	1	.033**	2.165
	[Non-farm only =2.00]	1.050	.659	2.538	1	.111	2.857
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.

a. The reference category is: Food secure.

b. This parameter is set to zero because it is redundant.

*significant at $p<0.01$, ** significant at $p<0.05$

Source: Sample survey, 2016

In table 6.6, the predicting variable is livelihood strategies having three categories: agricultural, non-farm, both agricultural and non-farm clusters. Model result shows households whose livelihood was confined to non-farm sector were more likely to be severely food insecure. Holding other categories

constant, these households were 40 times more likely to be severely food insecure than households who diversified their livelihood across agricultural and non-farm activities. Farming households were 9 times more likely to be moderately food insecure than households who combine their livelihood activities. However, farming households were relatively better on the level of food security as compared to those limited to non-farm livelihood. Households with diverse livelihood activities were more food secure than households in the two livelihood clusters.

In conclusion, the findings of this thesis converges the notion that participation in the rural nonfarm economy provides pathway for upward mobility. Though opportunity-led diversification is biased in favor of the wealthier households, survival-led diversification has more contributions (Sosina et al. 2012). In strengthening this, Devereux (2000:1) attributed food insecurity in Ethiopia directly to dependence on undiversified livelihoods based on low-input, low-output rain-fed agriculture.

6.4. Summary of challenges facing smallholder farmers and the household food security

Farmers in the study area face different problems to lead viable livelihood. Some are related to natural vagaries while others are induced by economic factors. Of 177 sample households who produce crops, half of them 91 (51.4 percent) reported decreasing crop production over time. The major factor underlying the decline of crop was erratic rainfall as stated by 86 percent of farmers.

In addition to these, households in the study area were affected by Derba cement factory. Of the total respondents, 41 percent of them were affected by cement factory; 66 percent of respondents lost farmland. Farmers lost 89 hectares of land. Flood and sedimentation caused by quarry affected the livelihood of study households. Land acquisition is worsened by expansion of quarry area and end up in displacement of 15.7 percent of respondents. The proportion of food secure sample was 41; the remaining 59 percent of respondents experience at least one condition of food insecurity.

Chapter Seven

7. Conclusion and Implications

This chapter concludes the main objective of the study. It synthesizes the major findings of the study based on presentations and triangulations of results in previous chapters. Summaries provided at the end of each chapter of the findings are subsumed into concluding remarks. Contingent up on the major findings of the study, this chapter also suggested implications for further research, policy and theory that are believed to enhance the comprehensive understanding and intervention of the theme under investigation, livelihood and food security.

7.1. Conclusion

Rural livelihoods are heterogeneous. Households in the study area pursue diverse livelihood activities. In this study, the various livelihood activities of the respondents were categorized in to three livelihood portfolios: agricultural, non-farm, and both agricultural and non-farm cluster. Majority of the households undertake agricultural livelihood strategies while the importance of non-farm livelihood activities are also growing. Agro ecological condition, the main stratifying variable of this study, was found to affect the choice and distribution of livelihood strategies. Samples from highland and midland agro-ecologies were more likely to intensify agriculture while the lowland households more attune to bringing forest and grassland under cultivation. Irrigation is also an important method of supplementing annual crop production, mainly in the lowland agro-ecology.

Non-farm livelihood activities are also widespread in the study area. More than half of the respondents pursue at least one non-farm livelihood activities. These involve self-employment and wage employment in various activities. The relevance of rural non-farm enterprises can be noted in the study area where 37.2 percent of the respondents supplement agricultural livelihood activities with non-farm livelihood strategies. Others undertake non-farm as their main livelihood activities.

Not all rural livelihood activities are available to all households. Even within a small area, heterogeneous livelihood strategies are observed. Rural people do not make their livelihood in a vacuum rather there are livelihood resources and contexts under which people make their living. It is not only specific resource that matters but also the way people combine their existing resources to make viable livelihood.

Landlessness is at the center rural peoples' decision to join non-farm labor market though it is not entirely responsible. Some others have access to land; yet having access to land is not sufficient in itself for farmers. Size, adequacy and quality also matter. With this regard, this study found that the respondents live on fragmented land. The distribution of landholding size and fertility were not uniform among respondents in one kebele. ANOVA test showed that mean landholding size significantly differentiated between agricultural and non-agricultural livelihood strategies where the former group has relatively large land holding size to intensify agriculture.

In-depth interview with model farmers indicated that farmers use locally made physical assets like carts to generate cash. In spite of these appreciable efforts, respondents noted the underdeveloped infrastructure that precludes efforts to maximize livelihood returns. Road networking projects were interrupted and hindered mobility of resources across different livelihood settings. Attributed to this, respondents conceived that they travel long hours to access all year motorized road, water sources, health center, and town. Distance from rural infrastructure restricted the motive to adopt technologies and diversify livelihood activities which would result in positive livelihood outcome.

Credit service is decisive for rural people to purchase farm inputs and invest on non-farm business. In absence of credit, individuals are unable to smooth consumption in spite of a strong desire to do so. In other words, households which have no credit access were confined in low return livelihood activities. In the study area, few of the respondents use credit. Formal credit is underdeveloped and

where exist accessed by well off households. The large majority of respondents fear credit due to vulnerable livelihood they are undertaking. This makes vicious circle of cash constraint and low return livelihood for farmers.

Markets, social relations and agricultural extension make the access of the aforementioned resources possible. Those respondents who are proximate to market places had more probability to undertake both agricultural and non-farm livelihood activities. According to survey results, more critical with respect to market access was the volatility of product prices. Farmers have limited information on market and sell bulk of their product during abundance to purchase farm inputs. As a result, they secure minimum cash. Such uncertain market performance discourages resource exchange and the livelihood combinations that rural households choose.

Farmers are more likely to intensity agriculture if agricultural extension services are available and the system of delivery is efficient. In-depth interview and FGDs indicated that the interface between extension workers and farmers was limited. This affected the development of land and livestock which in turn impacts the livelihood activities of farmers.

Multinomial logistic regression results depict that landholding size, livestock, age, number of dependents, and distance from market negatively affect the possibilities of household to combine agriculture and non-farm livelihood activities. For instance, older respondents were less likely to pursue non-farm activities. Educational level of respondents on the other hand positively and significantly affects the likelihood of combining different livelihoods. Overall, households were found to engage in non-farm livelihood as a necessity than choices.

The processes of making livelihood are not entirely positive for rural households. There are vulnerability fronts under which people strive to realize their livelihood strategies. Interview and FGDs converged on the assertion that crop failure and distorted cropping pattern are mainly induced

by climate. Other factors underlying the declining trend of crop production were land degradation, lack of labor, prevalence of disease and land fragmentation over time. These agricultural problems are not unique to the study area but they are not equally distributed among respondents. Some farmers run easily vulnerable livelihood system than others.

The major location specific challenges facing smallholder farmers was posed by Derba cement factory. The factory claimed large farmland of the respondents for plant site, for quarry and for road development. Some farmers lost all their lands and end up in poor living condition. For rural households who have no skill to adopt other livelihood activities, being landless is critical. The situation is worsened because there are no preliminary adjustments that make smallholder farmers to switch to other livelihood activities. As a result, some of the farmers were obliged to migrate. In addition to farmland, extensive pastureland and water points were encroached. This affected the development of livestock sector as victims unanimously reiterated.

Households secure their food access based on the activity they undertake. Though majority of the respondents get food through own production, significant proportion of respondents depends on market for their food. This indicates that food production of the respondents was not adequate to feed them year round. Agrarian households, who are the producers of food themselves, face food shortage. Respondents whose livelihood activities are limited to non-farm livelihood were with higher risk of food insecurity. The majority of food secure households from the sample were those who combine both agriculture and non-farm. Interviewees regarded cash from non-farm livelihood activities as a gap filler for households to acquire food during the time of food shortage.

In conclusion, undertaking viable livelihood strategies is a determining factor for the realization of household food security. Nonetheless, uneven opportunities remain a challenge for rural people.

7.2. Implications for research and policy

As stated under the delimitation of this study there are areas that need to be investigated further, which this thesis did not deal with. This work however informs more researches and policy orientations that could address the livelihood of rural people. Under this section, implications for research, policy and theory are discussed.

7.4.1. Implication for research

- I. This study employed sustainable livelihood framework in analyzing the livelihood strategies and food security at the household level. The findings of this study indicated that employing sociological theories would make the study of livelihood of people more complete. Researchers can integrate system theories in to the analysis of rural wellbeing through considering institutions as parts working for the realization of livelihood security.
- II. Beside agriculture rural non-farm are growing. As per to this study, there are rural households who engage only in non-farm businesses. Therefore, researches need to consider not only the diversity but also changes and transitions between rural livelihood activities. Pertinently, the findings of this thesis suggest the scenario of studying the distribution of rural non-farm livelihoods and challenging the conventional notion which identify rurality with agriculture.
- III. Majority of studies on household food security incline to objective measurement of food security. This thesis employed the subjective aspects of household food access and found considerable variations in food access among rural households. The finding of this study advocates for interested scholars to merge nutritional measurements with subjective proxies to narrow the flaws of household food security measurement.
- IV. The study also suggests the need to investigate the nature of rural non-farm enterprises that are farmer friendly and need driven so that transitions between sectors are possible.

7.4.2. Implication for policy and interventions

- I. Rural livelihoods are increasingly diversified. Rural households tend to supplement agriculture with non-farm-sectors which is vital in spreading risk management strategies. In Ethiopia, where pressure on land is high due to population pressure, non-farm livelihood activities are reliefs. Consequently, rural poverty reduction strategies need to incorporate programs on enhancing rural non-farm enterprises that absorb the surging rural population.
- II. The food security situation of households with different livelihood strategies was found to be different. The possibilities and challenges of different livelihood groups with respect to ensuring household food security also differ. So, rural development plans need to consider the heterogeneous nature of livelihood groups in order to respond challenges accordingly.
- III. The majority of rural households combine their agricultural living with non-farm due to pushing factors. Landless are frequently forced to adopt non-farm livelihood activities. Since decisions are of necessity, households undertake available low return non-farm activities. This demands a deliberation for the development of non-farm activities that are tied to agriculture so that farmers can easily maintain both agriculture and non-farm activities for better living.
- IV. From the finding of the study, it is clear that infrastructures hampered the opportunities of enhancing livelihoods. Underdeveloped road networks affected access to market, water, and town visit. This calls for the designing of interventions addressing rural social service.
- V. Where agricultural extension is less effective, people choose to expand the limited land available for crop production. Limited agricultural extension service also results in underutilization of resources like land and livestock with which Ethiopia is believed to have comparative advantage. As a result, extension packages need to be sensitive to the problems of people and enhance the productive capacity of resources at grassroots level.

- VI. The trend of non-farm investments claiming rural land is mounting. These investments while claiming land from smallholders are not paying back the expected return to the community. In nations like Ethiopia where smallholders are at the core of the economy, this trend affects the path to ensure food security. In order to benefit from large non-farm investments and smallholder farming, win-win strategies are required. Hence, forward and backward linkages between agriculture and manufacturing sector are need to be sensitized.
- VII. Credit services are rarely observed in the sampled rural area. Farmers' cooperatives are nonexistent. In order for rural livelihood to thrive, resource-mobilizing associations are needed. As a result, local administrative units are better to widen the opportunities for the emergence of enterprises that involve farmers. This would have gains of enhancing human capital in addition to improving the economic performance of agrarian households.

References

- Aabø, Ellen and Thomas Kring.2012. *The Political Economy of Large-Scale Agricultural Land Acquisitions: Implications for Food Security and Livelihoods/Employment Creation in Rural Mozambique*. Working papers 2012-004. United Nations Development Program.
- ACF.2010. *Food Security and Livelihood Assessments: A Practical Guide for Field Workers* Technical Department of Food Security and Livelihoods.
- Adugna Eneyew Bekele. 2008. “Livelihood strategies and food security in Wolaita, Southern Ethiopia: The case of Boloso Sore District.” M.Sc. Thesis, Haramaya University.
- Alinovi,L., Marco D’errico, Erdgin Mane And Donato Romano.2010. *Livelihoods Strategies and Household Resilience to Food Insecurity: An Empirical Analysis to Kenya*. Senegal, Dakar: European Report of Development.
- AGRA (Alliance for green revolution in Africa) .2014. *African Agriculture Status Report: Climate Change and Smallholder Agriculture in Sub-Saharan Africa*. Nairobi, Kenya.
- AGRA (Alliance for green revolution in Africa). 2015. *Africa Agriculture Status Report: Youth in Agriculture in Sub-Saharan Africa*. Issue No. 3. Nairobi, Kenya.
- Amare Demissie, Belayneh Legesse .2013. “Determinants of income diversification among rural households: The case of smallholder farmers in Fedis district, Eastern Hararghe zone, Ethiopia.” *Journal of Development and Agricultural Economics* 5(3):120-128.
- Arce, A. 2003. “Value contestations in development interventions: Community development and sustainable livelihoods approaches.” *Community Development Journal* 38(3): 199-212.
- Arega Bazezew, Woldeamlak Beamlak, and Nicolau, M. 2013. “Rural households’ livelihood assets, strategies and outcomes in drought-prone areas of the Amhara Region, Ethiopia: Case Study in Lay Gaint District.” *African Journal of Agricultural Research* 8(46):5716-5727.
- Asmah,E. 2011. “Rural Livelihood Diversification and Agricultural household welfare in Ghana.” *Journal of Development and Agricultural Economics* 3(7):325-334.
- Baiphethi, MN and PT Jacobs. 2009. “The contribution of subsistence farming to food security in South Africa.” *Agrekon* 48 (4): 459-482.
- Ballard,T.J., Anne W. Kepple and Carlo Cafiero .2013. *The food insecurity experience scale: development of a global standard for monitoring hunger worldwide*. Technical Paper. FAO. Rome. Retrieved January 2016 (<http://www.fao.org/economic/ess/ess-fs/voices/en/>).
- Barrett, C. B., Reardon, T. and Webb, P. 2001. “Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics and Policy Implications.” *Food Policy* 26(4): 315-331.

- Barret, C, Mesfin Bezuneh, Daniel C. Clay, and Thomas Reardon. 2005. "Heterogeneous Constraints, Incentives and Income Diversification Strategies in Rural Africa." *Quarterly Journal of International Agriculture* 44(1): 37–60.
- Bebbington,A. 1999. *Capitals and capabilities: A framework for analyzing peasant viability, rural livelihoods and poverty in the Andes*. Institute for Environment and Development, London:UK.
- Benedict, A.O.2011. "The People – Food Predicament in Africa: The Quest for Food Security." *International Journal of Humanities and Social Science* 1(19):257-268.
- Benett,N. 2010. *Sustainable Livelihoods from Theory to Conservation Practice: An Extended Annotated Bibliography for Prospective Application of Livelihoods Thinking in Protected Area Community Research*. Protected Area and Poverty Reduction Alliance Working Paper No. 1. MPARG (UVic); PAPR (VIU): Victoria, Canada
- Bernard, H.Russel.2006. *Research methods in Anthropology: Qualitative and Quantitative Approaches*. Second Edition, London: SAGE Publications.
- Birara Endalew, Mequanent Muche, and Samuel Tadesse. 2015. "Assessment of food security situation in Ethiopia: A Review." *Asian Journal of Agricultural Research* 9(2):55-68.
- Boto,I. 2014. *Realizing The Promise of Agriculture for Africa's Transformation*. Brussels.
- Brown, D.R., Emma C. Stephensb, James Okuro Oumac, Festus M. Murithid and Christopher B. Barrett.2006. "Livelihood Strategies in the Rural Kenyan Highlands." *African Journal of Agricultural and Resource Economics* 1(1): 21-36.
- Bryceson,D .1999. *Sub-Saharan Africa Betwixt and Between: Rural Livelihood Practices and Policies*. De-Agrarianisation and Rural Employment Network. ASC Working Paper 43. Leiden the Netherlands.
- Bryceson,D.2002."Rural Africa at the Crossroads: Livelihood Practices and Policies." *Natural Resource Perspective*. Number 52: 1-6.
- Burchi and Muro 2012: Burchi, F. & De Muro, P. 2012. *A Human Development and Capability Approach to Food Security: Conceptual Framework and Informational Basis*. Working Paper 2012-009: United Nations Development Programme.
- Carney,D. 1998. *Sustainable rural livelihoods. What contribution can we make?* Nottingham.
- Carswell, G. 2002. "Livelihood Diversification: Increasing In Importance Or Increasingly Recognized? Evidence from Southern Ethiopia." *Journal of International Development* 14(n) 789–804.
- Castalonge,O.W. 2008. *Agricultural Systems: Economics, Technology and Diversity*. New York: Nova Science Publishers, Inc.

- Chambers, R and Gordon Conway (1991), *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. IDS Discussion Paper No. 296; Brighton: Institute of Development Studies.UK.
- Chambers,R. 2001.*Qualitative Approaches: Self Criticism And What Can Be Gained From Quantitative Approaches*. UK: University of Sussex.
- Chikopela,J. 2014.“Livelihood Strategies of Small-Scale Farmers In Nankanga Camp Of Kafue District, Zambia.” MA Thesis. University of Zambia.
- Clover,J. 2003. “Food Security in Sub-Saharan Africa.” *African Security Review* 12(1):5-14.
- Coates,J., Anne Swindale and Paula Bilinsky. 2007. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide, VERSION 3*. Washington, DC: Food and Nutrition Technical Assistance Project (FANTA).
- Coates,J., Patrick Webb, and Robert Houser. 2003. *Measuring Food Insecurity: Going Beyond Indicators of Income and Anthropometry*. Washington, D.C: Food and Nutrition Technical Assistance Project, FHI 360.
- Creswell, W. John. 2003. *Research Design Qualitative, Quantitative and Mixed Methods Approaches*. 2nd ed. New Delhi: Sage Publications Inc.
- CSA.2007. *National Population and Housing Census*. Addis Ababa, Ethiopia.
- CSA.2011. *Agricultural Sample Surveys*. Central Statistical Agency, Addis Ababa, Ethiopia.
- CSA.2013. *Population Projection of Ethiopia for All Regions at Wereda Level from 2014 – 2017*. Addis Ababa, Ethiopia.
- De Zoysa,R.2013. *The implications of large scale land acquisition on small landholder’s food security*. DPU Working Paper No. 156. University College London.
- Defferew Kebede. 2011. “The Impact of Drought on Livelihoods, Vulnerability and Coping Mechanisms: the Case of North Shoa Zone, Oromiya.” Masters Thesis in Public Administration and Management, Addis Ababa University, Ethiopia.
- Degefa Tolossa. 2002. *Household Seasonal Food Insecurity in Oromiya Zone, Ethiopia: Causes*, Social Science Research Report Series, No.26, OSSREA, Ethiopia, Addis Ababa.
- Degefa Tolossa. 2005. *Combining household qualitative data and quantitative data in food security research*. Working papers on population and land use in Central Ethiopia. No.5. Acta Geographica-Trondheim: Geografisk Institutt, NTNU.
- Degefa Tolossa. 2009. *An Assessment of the Role of Local Institutions and Social Capital in Household Food Security: A Case Study at Two Rural Communities in Oromiya Zone*,

- Amhara Region*. In: Proceedings of the 16th International Conference of Ethiopian Studies, ed. by Svein Ege, Harald Aspen, Birhanu Teferra and Shiferaw Bekele. Trondheim.
- Degye Goshu, Belay Kassa and Mengistu Ketema. 2013. "Measuring diet quantity and quality dimensions of food security in rural Ethiopia." *Journal of Development and Agricultural Economics* 5(5):174-185.
- Deitchler, M., Terri Ballard, Anne Swindale and Jennifer Coates. 2010. *Validation of a Measure of Household Hunger for Cross-Cultural Use*. Washington, DC: Food and Nutrition Technical Assistance II Project (FANTA-2) FHI 360.
- Dessalegn Rahmato. 2009. *The Peasant and the State: Studies in Agrarian Change in Ethiopia 1950s-2000s*. Addis Ababa: Addis Ababa university press.
- Devereux, S.2000. *Food Security in Ethiopia*. IDS, University of Sussex.UK.
- Devereux,S, Bob Baulch, Karim Hussein, Jeremy Shoham Helen Sida, and David Wilcock.2004. *Improving the Analysis of Food Insecurity Food Insecurity Measurement, Livelihoods Approaches and Policy: Applications in FIVIMS*. Institute of Development Studies, University of Sussex.
- DFID. 2004. *Agriculture, hunger and food security*. Agriculture and Natural Resources Team, UK.
- DIFID .1999. *Sustainable livelihoods and poverty elimination*. London: UK Department for International Development.
- Djurfeldt, A. 2015. "Multi-Local Livelihood and Food Security in Rural Africa." *Journal of International Development* 27(n) 528–545.
- DMC.2008. *Resettlement Action Plan Summary*. Establishment of 5,600 TPD Greenfield Cement Project And Operation Of Captive Mines Near Derba Village, Oromia Regional State, Federal Democratic Republic Of Ethiopia. Addis Ababa, Ethiopia
- Dorward, A., Simon Anderson, Susanne Clark, Bernadette Keane, and Julieta Moguel. 2001. *Asset Functions and Livelihood Strategies: A Framework for Pro-Poor Analysis, Policy and Practice*.UK.
- Ellis, F. 1999. *Rural livelihood diversity in developing countries: evidence and policy implications*. Natural Resources Perspective. Overseas Development Institute.UK.
- Ellis, F. 2000. *Rural Livelihood and Diversity in Developing Countries*. Oxford: Oxford University Press.
- Ellis, F. and Allison, E. 2004. *Livelihood Diversification and Natural Resource Access*. Food and Agriculture Organisation of the United Nations, Livelihood Support Programme Working Paper 9, Overseas Development Quintile, University of East Anglia, UK.

- Ellis, F.2007. "Household strategies and rural livelihood diversification." *The Journal of Development Studies* 35(1):1-38.
- Ellis,F and H.Ade Freeman. 2005. *Rural Livelihoods and Poverty Reduction Policies*. London: Routledge.
- EEA (Ethiopian Economics Association). 2009. *Report On The Ethiopian Economy Development, Prospects And Challenges Of The Energy Sector In Ethiopia*. Volume Vii 2007/08. Addis Ababa, Ethiopia.
- FAO, WFP and IFAD. 2014. *The State of Food Insecurity in the World 2014: Strengthening the enabling environment for food security and nutrition*. Rome: FAO.
- FAO, WFP, and IFAD.2012.*The State of Food Insecurity in the World: Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition*. Rome: FAO.
- FAO. 2008. *An Introduction to the Basic Concepts of Food Security*. Rome: FAO Food Security Programme.
- FAO. 2010. "Country profile: Food security indicators: Ethiopia." Retrieved December, 2015 (http://www.fao.org/fileadmin/templates/ess/documents/food_security_statistics/country_profiles/eng/Ethiopia_E.pdf).
- FAO.2009. *Declaration of the World Summit on Food Security*. World Food Summit 16-18 November 2009. Rome.
- Farrington, J., Diana Carney, Caroline Ashley, and Cathryn Turton.1999. *Sustainable Livelihoods in Practice: Early Applications of Concepts in Rural Areas*. Number 42. Natural Resource Perspective. ODI, UK.
- FDRE (Federal Democratic Republic of Ethiopia) .1996. *Food Security Strategy*. Prepared for the Consultative Group Meeting of December 10 – 12, 1996. Addis Ababa. Ethiopia.
- Fekadu Beyene and Mequanenet Muche. 2010. "Determinants of Food Security among Rural Households of Central Ethiopia: An Empirical Analysis." *Quarterly Journal of International Agriculture* 49 (4): 299-318.
- Fekede Feyissa, Shiv Prasad, Getnet Assefa, Getu Kitaw and Seyoum Bediye.2013. "The status of production, conservation and utilization of natural pasture hay for feeding dairy cattle in the greater Addis milk-shed, central highlands of Ethiopia." *Journal of Agricultural Research and Development* 3(6):82-93.
- Freeman,H.,Jabbar,M.,and Simon E. 1996. "The Role of Credit in the Uptake of Improved Technologies." *Ethiopia Journal of Economics* 1(1) pp. 25-40.

- Gathiaka, J.K., and M. Kinyanjui Muriithi. 2013. *An Empirical Analysis of Livelihood Strategies and Food Insecurity in Turkana County, Kenya*. Final Report to be presented at the African Economic Research Consortium (AERC) Biannual Conference, Arusha Tanzania: AERC.
- Gesese S, and Mberengwa Ignatious. 2012. "The Role of Off- And Non-Farm Activities In Achieving Sustainable Rural Livelihoods Security In Gubalfto Woreda, North Wollo Zone, Amhara Region State, Ethiopia." *Journal of Sustainable Development in Africa* 14 (5): 126-143.
- Getachew Alemu. 2014. "Assessing the Impacts of Soil erosion on Farm-land and Conservation Practices in Sululta Woreda, Oromia Regional State, Ethiopia." MA Thesis, Department Of Geography and Environmental Studies, Addis Ababa University, Ethiopia.
- Getahun Bikora. 2003. *Food security Challenges in Ethiopia: proceedings of the food security conference*. Professional Associations Joint Secretariat. Addis Ababa, Ethiopia.
- Gutu Tesso, Bezabih Emanu, and Mengistu Ketema . 2012. "Analysis of vulnerability and resilience to climate change induced shocks in North Shewa, Ethiopia." *Agricultural Sciences* 3(6):871-888.
- Hadju, F.2006. *Local worlds: Rural Livelihood Strategies in Eastern Cape, South Africa*. Department of Water and Environmental Studies. Linköping: Linköping University.
- Haggblade, S., and Hazell, P. 2010. *Successes in African agriculture: Lessons for the future*. John Hopkins University Press.
- Haggblade, S., Hazell, P., and Reardon, T. 2010. "The rural non-farm economy: Prospects for growth and poverty reduction." *World Development* 38(10):1429–1441.
- Haidar. M.2009. *Sustainable Livelihood Approaches The Framework, Lessons Learnt From Practice And Policy Recommendations*. Expert Group Meeting on Adopting the Sustainable Livelihoods Approach for Promoting Rural Development Economic and Social Commission for Western Asia (ESCWA) Region. UNDP Drylands Development Centre. Beirut.
- Hazell, P.2011. *Five big questions about five hundred million small farmers*. Paper presented at the IFAD Conference on New Directions for Smallholder Agriculture. Rome: IFAD.
- Healey, J.F. 2009. *Statistics: A Tool for Social Research*. Eighth. Belmont, Ca, USA: Wadsworth Publishing.
- Hoddinott, J., and Yisehak Yohannes. 2002. *Dietary Diversity as a Food Security Indicator*. FCND Discussion Paper No. 136, Washington D.C.
- Hussein, K.2002. *The Relevance of Livelihoods Approaches to Food Insecurity Measurement* Karim Hussein, UK: Overseas Development Institute.

- IFPRI. 2015. *Global Nutrition Report 2015: Actions and Accountability to Advance Nutrition and Sustainable Development*. Washington, DC.
- Jemal Abafita and Kyung-Ryang Kim. 2014. "Determinants of household food security in rural Ethiopia: An Empirical Analysis." *Journal of Rural Development* 37(2):129-157.
- Kanbur, R. 2001. *Q-Squared? A Commentary on Qualitative and Quantitative Poverty Appraisal: Complementarities, Tensions and the Way Forward*, Working Paper, No. 2001-05, Ithaca: Department of Applied Economics and Management, Cornell University, USA.
- Kassa Fekadu. 2015. "Ethiopian Seasonal Rainfall Variability and Prediction Using Canonical Correlation Analysis (CCA)." *Earth Sciences* 4(3): 112-119.
- Kassahun Berhanu. 2012. *The Political Economy of Agricultural Extension in Ethiopia: Economic Growth and Political Control*. Brighton: University Of Sussex. Future Agricultures Consortium.
- Kirkland, T., Robert S. Kemp, Lori M. Hunter, and Wayne Twine. 2011. *Toward Improved Understanding of Food Security: A Methodological Examination Based in Rural South Africa*. Population Program.
- Krantz, L. 2001. *A sustainable livelihood approach to poverty alleviation*. SIDA.
- Lavers, T. 2012. "Land grab' as development strategy? The political economy of agricultural investment in Ethiopia." *The Journal of Peasant Studies* 39(1):105-132.
- Legesse Dadi and Chala Erko. 2005. *Reversing vulnerability of rural livelihoods in Ethiopia: options for sustainable development*. Agricultural economic society of Ethiopia. Addis Ababa.
- Levine, S. 2014. *How to study livelihoods: Bringing a sustainable livelihoods framework to life*. Working Paper 22. Secure Livelihoods Research Consortium. London: Overseas Development Institute.
- Loison, S.A. 2015. "Rural Livelihood Diversification In Sub-Saharan Africa: A literature review." *The Journal of Development Studies* 51(9): 1125-1138.
- Løvendal, C.R., Marco Knowles and Naoko Horii. 2004. *Understanding Vulnerability to Food Insecurity Lessons from Vulnerable Livelihood Profiling*. ESA Working Paper No. 04-1 8. Agricultural and Development Economics Division (ESA). Rome: Food and Agriculture Organization.
- Maharjan, L. 2014. *Communities and Livelihood Strategies in Developing Countries*. Tokyo: Springer.
- Masefield, A. 2001. *Chronic food insecurity in Ethiopia: looking through a livelihood lens*. In: Yared A (ed): *Proceedings on Food security and sustainable livelihoods in Ethiopia*. Forum for Social Studies, March 10-11, 2000, Addis Ababa, Ethiopia.

- Matshe, I.2009. “*Boosting smallholder production for food security: some approaches and evidence from studies in sub-Saharan Africa*”. *Agrekon* 48 (4): 483-511.
- Matsumoto,T., Yoko Kijima,and Takashi Yamano. 2006. “The role of local nonfarm activities and migration in reducing poverty: evidence from Ethiopia, Kenya and Uganda.” *Agricultural Economics* 35: 449-458.
- Maxwell and Smith. 1992. *Household Food Security; A Conceptual Review*. In S.
- Mensah,C. 2014. “The Impact of Livelihood Diversification on Food Security amongst Farm Households in Northern Ghana: A Case Study of Bole District.” MA Thesis. University of the Western Cape, Ghana.
- Mesay Mulugeta.2009. “Causes Of Rural Household Food Insecurity: A Case From Kuyu District, Central Ethiopia.” *Journal of Sustainable Development in Africa* 11(4):286-304.
- Mesfin Welderufael. 2014. “Determinants of Households Vulnerability to Food Insecurity in Ethiopia: Econometric analysis of Rural and Urban Households.” *Journal of Economics and Sustainable Development* 5(24):70-79.
- MoFED (Ministry of Finance and Economic Development). 2012. *Ethiopia’s Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11)*. Addis Ababa, Ethiopia.
- MoFED (Ministry of Finance and Economic Development). 2002. *Ethiopia: Sustainable development and poverty reduction program (SDPRP)*. Addis Ababa: MoFED.
- MoFED (Ministry of Finance and Economic Development). 2005. *Ethiopia: Building on progress. A plan for accelerated and sustained development to end poverty (PASDEP)*. Addis Ababa: MoFED.
- MoFED (Ministry of Finance and Economic Development). 2010. *Ethiopia Animal Health Year Book*. Addis Ababa: Federal Ministry of Agriculture Animal and Plant Health Regulatory Directorate (APHRD).
- Miyuki,I. 2006; *Livelihoods Diversification Patterns among Households and their Implications on Poverty and Resource Use: A Case Study from a Kerio River Basin Community*. Land Use Change Impacts and Dynamics (LUCID) Project Working Paper No. 51. Nairobi, Kenya: International Livestock Research Institute.
- Mkhinze, B. 2009. *Challenges and Opportunities for African Agriculture and Food Security: High Food Prices, Climate Change, Population Growth, and HIV and AIDS*. Expert Meeting on How to feed the World in 2050. Rome: Food and Agriculture Organization of the United Nations.

- Moges Gobena. 2010. *Effects of Large-scale Land Acquisition in Rural Ethiopia The Case of Bako-Tibe Woreda*. Uppsala: Swedish University of Agricultural Sciences.
- Molledo, A., Nathalie Troubat, Michael Lokshin, and Zurab Sajaia. 2014. *Analyzing Food Security Using Household Survey Data*. Washington, DC: World Bank.
- Morris, M., John Butterworth, Richard Lamboll, Evelyn Lazaro, Faustin Maganga, and Neil Marsland. 2002. *Understanding Household Coping Strategies: Household Livelihood Strategies in Semi-Arid Tanzania: Synthesis of Findings*. Natural Resources Advisers' Conference. UK.
- Morse, S., and N. McNamara. 2013. *Sustainable livelihood approach: The Theory Behind the Sustainable Livelihood Approach*. Springer Science, Business Media Dordrecht.
- Murphy, S. 2012. *Changing Perspectives: Small-scale farmers, markets and globalization*. IIED/Hivos, London/The Hague.
- Murray, C. 2001. *Livelihoods research: some conceptual and methodological issues*. Background Paper 5. University of Manchester. UK: Chronic Poverty Research Centre.
- Ncube, A. 2014. "Impact of Livelihood Diversification on Household Food Security: The Case Of Hurungwe District, Zimbabwe." MA Thesis, development studies, university of southern Africa.
- Obi, A. 2011. *Institutional constraints to small farmer development in Southern Africa*. Netherland: Wageningen Academic Publishers
- Oni, O., and Ayodele E. Fashogbon. 2012. *Food poverty and livelihood issues in rural Nigeria*. Nigeria: University of Ibadan.
- Oxfam. 2011. *Land and Power. The growing scandal surrounding the new wave of investments in land*. Oxfam Briefing Paper. Oxford, UK: Oxfam.
- Paramitta, P. 2013. "Between *Chamkar* and the Kitchen: A Livelihood Approach to The Implication Of Land Grabs On Food Security In Cambodian Rural Households." MA thesis, Graduate Institute of International And Development Studies, Geneva.
- Patel, K., Hom Gartaula, Derek Johnson and M. Karthikeyan. 2015. "The interplay between household food security and wellbeing among small-scale farmers in the context of rapid agrarian change in India." *Agriculture and Food Security* 4(16):1-16.
- Pieters, H., Anneleen Vandeplass, Andrea Guariso, Nathalie Francken, Alexander Sarris, Jo Swinnen, Nicolas Gerber, Joachim von Braun, and Maximo Torero . 2012. *Perspectives on relevant concepts related to food and nutrition security*. The Hague, Netherlands.

- Rahut, B., Akhter Ali, Menale Kassie, Paswel P. Marenya, and Chudamani Basnet. 2014. *Rural Livelihood Diversification Strategies in Nepal*. Policy Studies Organization Wiley Periodicals, Oxford.
- Rahut, B. and M. Micevska Scharf. 2012. "Livelihood diversification strategies in the Himalayas." *The Australian Journal of Agricultural and Resource Economics* 56(1):558–582.
- RPR (Rural Poverty Report). 2011. *New realities, new challenges: new opportunities for tomorrow's generation*. Rome.
- Saha, B., and Ram Bahal. 2010. "Livelihood Diversification Pursued by Farmers in West Bengal." *Indian Research Journal of Extension Education* 10(2):1-9.
- Salami, A., Abdul B. Kamara, Zuzana Brixiova. 2010. *Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities*, Working Papers Series Number 105, Tunis, Tunisia: African Development Bank.
- Samuel Gebreselassie. 2006. *Land, Land Policy and Smallholder Agriculture in Ethiopia: Options and Scenarios*. University Of Sussex, UK: Future Agricultures Consortium.
- Sasson, A. 2012. "Food security for Africa: an urgent global challenge." *Agriculture and Food Security* 1(2): 1-16.
- Scoones, I. 1998. *Sustainable livelihoods, a framework for analysis*, IDS Working Paper Number 72, Brighton: Institute of Development Studies.
- Scoones, I. 2009. "Livelihoods perspectives and rural development." *Journal of Peasant Studies* 36(1):1-26.
- Seifu, Hagos., Torleif Lunde, Damen H Mariam, Tasew Woldehanna, and Bernt Lindtjørn. 2015. "Is the adapted Household Food Insecurity Access Scale (HFIAS) developed internationally to measure food insecurity valid in urban and rural households of Ethiopia?" *BMC Nutrition* 1(2):1-10.
- Shumet Gizaw. 2009. *Poverty, Food insecurity and Livelihood strategies in Rural Gedeo: The case of Haroressa and Chichu PAs, SNNP*. Proceedings of the 16th International Conference of Ethiopian Studies. Trondheim.
- Smith, M., J. Pointing, and S. Maxwell. 1993 *Household food security: concepts and definitions, annotated biography*. Sussex UK: IDS.
- Sosina Bezu, Barrett, C. B., and Holden, S. T. 2012. "Does the nonfarm economy offer pathways for upward mobility? Evidence from a panel data study in Ethiopia." *World Development* 40(8): 1634–1646.

- Stifel,D.2010. “The rural non-farm economy, livelihood strategies and household welfare.” *African Journal of Agricultural Research* 4 (1): 82-109.
- Sululta Woreda Rural and Agricultural Development Office.2014. *Report*. Chancho. Unpublished.
- Suneetha,P. and Solomon Tekalign .2012. “Livelihood Activities, Challenges and Strategies at Participatory Forest Management Sub-Catchment in Hararge Highlands, Eastern Ethiopia.” *Journal of Research in Arts and Education* 2(5):25-37.
- Tiffen M., Mortimore, M. and Gichuki, F. 1994. *More People, Less Erosion: Environmental Recovery in Kenya*. African Centre for Technology Studies (ACTS) in association with the Overseas Development Institute. London: John Wiley & Sons Ltd. Chichester.
- Tsegaye Moreda. 2012. *Vulnerability, Land, Livelihoods and Migration Nexus in Rural Ethiopia: A Case Study in South Gondar Zone of Amhara Regional State*. International institute of social studies, Hague, Netherlands.
- UNECA. 2013. *Assessing Progress in Africa towards the Millenium Development Goals: Food security in Africa: Issues, challenges and lessons*. The United Nations Economic Commission for Africa (ECA).
- Wagayehu Bekele. 2006. “Analysis of Farmers’ Preferences for Development Intervention Programs: A Case Study of Subsistence Farmers from East Ethiopian Highlands.” *African Development Bank* 183-204.
- Walton,C. G. 2012. “Sustainable Livelihoods and Food and Nutrition Security of Kenyan Smallholder Farm Women.” PhD Dissertation, Department of Health Management, University of Prince Edward Island. Canada.
- Webb, P., Jennifer Coates, Edward A. Frongillo, Beatrice Lorge Rogers, Anne Swindale, and Paula Bilinsk. 2006. “Measuring Household Food Insecurity: Why It’s So Important and Yet So Difficult to Do.” *Journal of Nutrition* 136(5):1404S-1408S.
- Wiggins, Steve and Henri Leturque .2010 .*Helping Africa to Feed Itself: Promoting Agriculture to Reduce Poverty and Hunger.*, London, UK: Overseas Development Institute.
- Winters, P., Leonardo Corral and Gustavo Gordillo. 2001. *Rural livelihood strategies and social capital in Latin America: Implications for rural development projects*. Working Paper Series in Agricultural and Resource Economics. UK: University of New England.
- Woller, G.2009. *Livelihood and Food Security Conceptual Framework*. Washington Dc.
- Yared Amare.2001. *Food Security and Sustainable Livelihoods in Ethiopia: Proceedings of the Symposium of the Forum for Social Studies*. Addis Ababa, Ethiopia.
- Yenesew Swnet, Yizengaw, Eric Ndemo Okoyo, and Fekadu Beyene .2015. “Determinants of livelihood diversification strategies:The case of smallholder rural farm households in Debre

- Elias Woreda, East Gojjam Zone, Ethiopia.” *African Journal of Agricultural Research* 10(19):1998-2013.
- Yeraswork Admassie. 2010. *Social Research Methods*. The Office of Chief Academic Officer For Research, CAOR. Office of the Vice President for Research and Dean of the School of Graduate Studies. Addis Ababa University, Addis Ababa.
- Yishak Gecho, Gezahegn Ayele, Tesfaye Lemma, and Dawit Alemu. 2014. “Rural household livelihood strategies: Options and determinants in the case of Wolaita Zone, Southern Ethiopia.” *Social sciences* 3(3): 92-104.
- Young,H.,Sussane,Jaspars, Rebecca Brown, Jackie Frize, and Hisham Khogali .2001. *Food Security Assessments in Emergencies: A Livelihood Approach*. Humanitarian practice network paper. London: Overseas Development Institute.
- Zakaria, H., Afishata Mohammed Abujaja, Hamza Adam and Walata Yakub Salifu.2015. “Does Gender Makes Any Difference In Livelihoods Diversification? Evidence from Northern Ghana.” *International Journal of Agricultural Extension and Rural Development Studies* 1(1):36-51.
- Zegeye Tirfe and Hussein Hamda.2011. “Farm Households’ Food Insecurity, Determinants and Coping Strategies: The Case of Fadis District, Eastern Oromia, Ethiopia.” *Ethiopian Journals of Agricultural Economics* 8(1):1-33.
- Zerihun Gudeta. 2012. *Livelihood Strategies in Rural South Africa: Implications for Poverty Reduction*. Triennial Conference, Foz do Iguacu, Brazil.

Annex 1a. Household Survey Questionnaire

Addis Ababa University
College of Social Sciences
Department of Sociology
Household Survey Questionnaire

Dear respondent! The aim of this questionnaire is to collect data for the study entitled “Rural Livelihood and Household Food Security: The Case of Sululta Woreda”. The study is one of the requirements for the completion of Masters of Arts degree in Sociology at Addis Ababa University. The study is indispensable in appraising the livelihoods of rural households in Sululta Woreda which will have a paramount relevance in suggesting key recommendations. Questions included in this instrument enable the researcher to get information pertaining to livelihood strategies, asset base of households, challenges in maintaining agricultural livelihood and the implication of existing livelihood strategies on food security at the household level. Information you will give serve only the stated academic purpose and thus your genuine response to questions is very important in achieving the goal of the study. Information you will honorably provide me will be kept confidential as you will never be identified. To this end, I ask you to respond to these questions kindly.

Section 1: General Information

Interviewer’s Name: _____ Signature: _____ Date: _____

Name of the Kebele : _____

Agro ecology (*Kolla, Woina Dega, Dega*) _____

Questionnaire ID Number:

General Instruction: Put the code number of responses in the corresponding boxes for close ended questions and provide detail information you can for the open ended questions (YOU ARE NOT RESTRICTED TO THE SPACE PROVIDED FOR OPEN ENDED QUESTIONS)

Section 2: Demographic and Socio-Economic Information

1. Sex of the respondent: (0= Female, 1=Male).....
2. Age of the respondent (**in complete year**).....
3. What is your ethnicity? (Oromo=1, Amhara=2, Others.....).....
4. Current marital status (Never Married=1, Married=2, Divorced=3, Widowed=4.....).....
5. Household size: Male _____ Females=_____, Total=_____
- Number of children: <15.....

Number of members aged: 16-64.....

Number of members: 65+.....

6. Educational Level of Household head (unable to read and write=1, read and write only =2, grade 1-4=3, grade 5-8=4, high school=5, Certificate or diploma =6, degree and above=7).....

7. The highest level of grade attained by Household head

8. Number of household members who are educated (including currently enrolled).....

9. Religion of respondent: Muslim=1, Orthodox=2, Protestant=3 Catholic=4, Waqefata=5.....

Section 3: Livelihood Strategies of Households

1. Are you a farmer? (No=0 (**SKIP TO Q. 12**), Yes=1).....

2.If your response to question # 1 is “**Yes**”, which are your agricultural activities?

Crop farming=1, Livestock raising=2, both crop farming and livestock raising=3.....

3.If your answer for question #2 involves “**crop farming option**” what are the crop type your household grown in 2006/07 E.C. meher season?

Crop type	Teff	Wheat	Barely	Maize	Sorghum	Bean/pea	Niger seed	Others
Output in 2006/07(in quintals)								
Quintals sold								
Income gained								

4. How do you rate the crop productivity of your household relative to your neighborhood? (Lower=1, almost equal=2, Higher=3).....

5. Which are the **methods** your household follows to support crop production? (More modern farm implements (fertilizer, seeds, chemicals) =1, traditional soil fertility management=2, Increasing labor working over the land=3, Using crop varieties on the same plot=4, Expanding previously uncultivated land=5, Crop rotation=6, Fallowing=7, If other

6. If your answer for question #2 involves “**livestock raising**” which are your livestock?

Type of livestock	Ox	Cow	Heifer	Bull	Calf	Donke	Horse	Mule	Sheep	Goat	Chick ens	Total
Number												
No. of animals sold in 2006/07 E.C												
Income obtained												

7. Of the following, which are your **three main** reasons to raise livestock? (To sell during livelihood crisis =1, for transport=2, for their products=3, for agricultural activities =4, to sell

and cover Non- food household expenses=5, to sell and Purchase food =6, Purchase agriculture inputs=7, **kan biraa**

8. Which of the following methods do you employ to increase the productivity of livestock (**Just the main**)? (Increasing the number of local livestock=1, introducing new breeding livestock=2, Fattening and selling for profit=3, other.....)
9. Which one of the following animal product is your **major** income source? (egg=1, honey=2, milk and milk products=3, if others, please specify.....)
10. Are you employed on agricultural works of other farmers? (No=0, Yes=1).....
11. What are the labor employments you are working in?.....

Non-farm livelihood activities

12. Does your household engage in non-farm activities? (No=0 (**SKIP TO Q.16**),Yes=1).....
13. If **Yes** to question # 11, indicate your response by putting “✓” corresponding to the activity?

Non-farm Livelihood Activities (Underline the specific activities and indicate their income correspondingly)	Response		Total monthly income
	Yes	No	
Trading activities (retailing, small ruminants, grain, shop)			
Unskilled wage employment (laborer, in construction, guards)			
Skilled non-farm work like masonry, carpentry, Flourmill operator			
Professional employment (formal employment, teacher, kebele)			
Renting properties (pack animals, house in urban areas)			
Remittance from household members/relatives			
Live on transfers like pension			
Local services (handicraft, local drinks, transportation, weaving			
Fuel wood/charcoal/dung cake selling			
Others			

14. If your answer to question number 12 is **Yes**, how do you undertake these activities? Temporarily/casually=1; seasonally or as par time activities=2; permanently=3.....
15. Why do you pursue nonfarm livelihood activities? (**Probe! Multiple Responses**) (have no other means of living =1, Because of low productivity of farming=2, have small land to rely on farming=3, uncertain agricultural performance=4, due to attractive nonfarm wage =5, to increase cash saving=6, due to wide opportunity available=7, because I have skill other than farming=8, proximity to urban area=9, if other please specify)

16. Which livelihood strategies do you think is more productive? Agricultural=1, non-agricultural=2, A combination of both agricultural and nonagricultural activities=3.....

Section 3: Rural Livelihood Resources and Mediating Institutions

Natural capital and Access

1. Do you have access to land? (Yes= 1, No=0 (**skip to Q. 17**)).....

2. If **yes to question #1**, what is your total land size (**Hint: 1 hectare= 4 Timad**).....

3. What is the proportion of your land (**In hectare**) for:
 Grazing ____, Tree planting _____, crop production _____, for other purposes _____

4. How many plots of land do you have (**Ask for the number farm land**).....

5. **If yes to question # 1**, how did you get land? (Allotment =1, Informal Purchase=2, Rent/lease=3, Inheritance =4, Sharecropping=5, Allotment plus sharecropping=6, Inheritance plus sharecropping=7, Gift=8, If any other means of access, please specify.....

6. Do you have irrigable land? (No=0(**SKIP TO Q.9**), Yes=1).....

7. Do you practice irrigation? (No=0, Yes=1).....

8. **If Yes to question #7**,What are the products you get from irrigation _____

9. How do you perceive the average fertility level of your farmland? (Poor Fertility=1, Moderate Fertility=2, Good Fertility=3).....

10. Rate the adequacy of your land size to support your household’s living? (Extremely inadequate=1, Inadequate=2, Adequate=3, Very Adequate=4).....

11. Did your household receive land use right certification? (No=0, Yes=1).....

12. Do you think you have security over the land you currently use? (No=0, Yes=1).....

13. If your answer is to **Q.12** is No, why?.....

14. Have you rented out your plot(s) to others in 2007? (No=0, Yes =1).....

15. Who was working on your land in 2007? (Myself=1, My Son=2, Renter=3, Share cropper=4, relatives=5, if others.....

16. If your answer for question **#15** is other than choice “1” **what is the reason?** (Lack of

oxen=1, lack of labor =2, inability to buy farm inputs=3, lack of farm experiences=4, because I am doing nonfarm activities=4,.....

17. Do you have an access to a communal land around your area? (No=0 (**SKIP TO 19**), Yes=1)

18. What is the **main** benefit your household derive from common land (fodder=1, wood/fuel=2, charcoal=3 if other please specify.....

Physical (infrastructure, productive goods and equipment) and Access to Market

19. What is the type of your living house? (Grass wall and grass roofed (Thatch) =1, Mud wall and grass roofed=2, Mud walls and galvanized iron roofed=3, other.....

20. Does your house has partition? (No=0, Yes=1).....

21. Indicate tools and equipment you possess by putting “✓” corresponding to items

Items	Mobile	Radio	Hoe, Ax	Plough	Grain store	Construction materials	Beehive	If other specify Horse cart, water pump
Yes								

22. What is the **main** source of your **agriculture related** information (Extension=1, Peers=2, Radio=3).....

23. What is the **main** source of energy for your household to cook (Fire wood=1, Animal Dung=2, Charcoal=3, Gas =4, electricity=5).....

24. Where is the **main** source of your drinking water? (River=1, Springs/streams =2, Traditional well/borehole=3, Ponds=4, Tapped/piped water=5, other.....

25. How much time it takes you to access the nearest water point (**in hours**).....

26. How much time it takes you to reach the nearest health center (**in hours**).....

27. What means of transport you **mostly use** to transport your produce? (Vehicles=1, Animals=2, Human=3).....

28. What means of transport you **mostly use** to visit nearby town? (Vehicles=1, Animals=2, Human=3).....

29. How much it takes you to get motorized road transport (**in Hours**)

30. Rate the level of affordability of car transport cost to your household (expensive/unaffordable=1, somewhat affordable=2, affordable=3.....

31. How much it takes you to access the nearest grind mill? (**In hours**)

32. How much it takes you to reach the nearby town? (**In hours**)

33. Where is your **main** marketing place?(**Just indicate the main**) (In our kebele=1, nearby rural kebele=2, nearby town woreda town=3.....

34. What do you think are the challenges of your market access? (**Multiple responses are possible**) (Long Distance =1, high transportation cost =2, price volatility=3, excessive broker influence =4, Lack of periodic information=5,Limited choice=6...)
35. How much it takes you to reach the nearby market place? (**in hours**).....
36. On average, How many times do you visit market within a week?.....

Human capital (skills, health, ability to labor or capabilities) and Financial asset

37. Which one of the following skills do you possess? **indicate by putting “✓” under the skill**

Skills	Masonry	Carpentry +thatcher	Tailoring	Traditional healing	Pottery works	Weaving	If other Ex. blacksmith, making agricultural implements
Yes							

38. How often do you listen to radio (Never=0, Rarely=1, Sometimes=2, Often=3.....)
39. Have you received any training on livelihood skill development? (No=0 (**SKIP TO Q.41**), Yes=1).....
40. What type of training did you receive? (Non-farm business related=1, farm productivity augmentation=2, health care and nutrition related=3, other _____...)
41. How do you perceive your health status (chronically ill=1, moderately healthy=2, healthy=3).....
42. How do you describe the health status of household in general? (Poor health=1, moderately healthy=2, good health=3).....
43. Number of household members with health problems
44. Do you have an access to credit service? (No=0 (**SKIP TO Q.47**), Yes=1).....
45. **If Yes to question number 46**, which one of the following source of credit is available for you? (**MULTIPLE RESPONSES ARE POSSIBLE**) (Ekub=1, Relatives and friends=2, Bank=3, Micro credit institutions=4, Private moneylenders=5.....)
46. **If Yes to question number 44**, what is/are the **main** credit available for you? (Fertilizer credit =1, Income generating credit=2, Improved seed credit=3, If other _____.....)
47. **If you don't have access to credit**, what is your main reason? No credit service in the area=1, high interest rate =2, Fear of indebtedness=3, lack of collateral=4, lack of awareness =5, I don't need it =6 If other please specify _____.....
48. Do you save money? (No=0 (**SKIP TO Q.51**), Yes=1).....
49. **If yes to question #48**, how do you save? (Cash at home=1, bank deposits=2, Equ=3, through livestock raising=4, buying jewellery=3, others _____)

50. **If you practice saving**, how much **ETB** you have accumulated currently?.....
51. What is your household largest expenditure **under during normal years**? Food =1; medical care=2; children cloth and schooling=3; farm inputs=4, tax =5; ceremonies=6, labor wage=7, If other, please specify.....
52. Do you receive remittance? (No=0 (**SKIP TO Q.55**), Yes=1).....
53. **If yes to question number 52**, who send you a remittance? (My son/daughter=1, parents=2, other relatives=3, organization=4, If other please specify
54. On avergae, how much EBirr did you get from remittance in 2007.....

Social Networks (realtions, trusts and cooperation on tasks) and Exteinsion Service

55. In which Community Based Organizations you are a member? **indicate by putting “✓”**

Local social relation structures	Iqub	Idir	Jigge/ Daboo	Religious Association	Kebele council	Women association	Five peer led	Committee or local groupings
Membership (YES)								
Benefits								

56. Rate your level of relationship with your neighborhood? (Poor =1, Moderate=2, Intact=3.....
57. Would you say you have relatives to rely on /ask for support in time of need? (No=0, Yes=1...
58. What is the benefit of your relationship with your neighbors? (Cooperation on tasks=1, sharing livestock=2, share land=3, borrow money=4, borrow grains=5, farm experience=6...
59. Are you a beneficiary of agricultural extension? (No=0 (**SKIP TO section 4**), Yes=1.....
60. What kind of agricultural extension services do you get? Fertilizers =**1**, Improved Seeds=**2**, Pesticides=**3**, Advices =**4**, Post-harvest loss management=5, Hybrid livestock=**6**, Skill development training=**7**, Market linkages=**8**, other.....
61. In a given year, how often do you consult agricultural extension worker(s) (Never=0 Rarely=1, Sometimes=2, Often=3).....
62. Rate level of satisfaction with the contribution of agricultural extension service? (Very satisfactory=4, satisfactory=3, dissatisfactory=2, very dissatisfactory=1.....
63. What kind of challenges you faced regarding extension service? (high cost =**1**, services are difficult to implement =**2**, services are not regularly available=**3**, extension workers are not committed=**4**, delay of inputs=**5**, shortage of inputs =**6**, if other please specify
64. How many ETB did you spend in 2006/07 on fertilizer_____ Chemicals_____

Section 4: Challenges Facing Small Holder Agriculture: The vulnerability context

1. How do you perceive the crop productivity of your farmlands overtime? (Increasing =1, Decreasing =2, Almost the same=3).....
2. If your **answer for question 1 is “decreasing”**, why (**Multiple response?** Pests and disease=1, land degradation=2, Insufficient landholding=3, declining application of farm implements=4, erratic rain fall pattern =5, lack of labor=6, other.....
3. Have you experienced crop **price** failure in 2006/07? No=0, Yes=1.....
4. Did you face crop failure due to drought in 2006/07? No=0, Yes=1.....
5. Did you give up the crop you want to plant due to rainfall delay in 2006/07? (No=0, Yes=1)
6. Has there been any change to your total land size/plots owned over the past ten years? (No=0, Yes=1).....
7. **If yes to question #8**, what is that change? Decrease holding =0, Increase holding=1.....
8. **If your answer is decreasing**, give reasons? (Transferred in the form of inheritance=1, leased out =2, Kebele took it=3, Degraded by flood=4, other.....
9. Which one of the following is a **major problem** of your household in livestock raising? Shrinking grazing land =1, Animal health problems =2, Water inaccessibility=3, Shortage of improved breeds=4, Poor price of livestock market=5, other
10. Do you think that agriculture is a viable livelihood strategy in supporting your livelihood No=0, Yes=1, I cannot decide=3
11. **If your answer for question 12 is No**, what are your reasons?
.....
12. Are you affected by cement factory in the area? (No=0 **GO TO Sec. 5**, Yes=1.....
13. What were the dispossessions caused to your assets? (**Multiple responses are possible**)
Lost your farm land =1, Displaced =2, Lost water points=3, Lost pasture=4, other.....
14. **If your response for question number 18** involves losing land, how much hectare did you lose? _____

Section Five: Food Security Situation

1. What is your **main** source of food? (Own farm production=1, Purchase =2, Government rations=3, Supplies from relatives/friends=4, work for Food (labor paid with food in-kind) =5, Other (Specify).....

2. **If your answer for question #1, is own production**, do you think that your annual produce is adequate to feed your household members throughout the year? (Yes=1, No=0).....
3. **If you answer for question #1, is own production**, on average, for how many **months** does the food you produced in a year support your household consumption?
4. When do you sell most of your crop? (Winter=1, autumn=2, summer=3, spring=4).....
5. When do you purchase most of your cereals? (Winter=1, autumn=2, summer=3, spring=4...
6. Explain the price difference between the seasons in which you sell most of your produce, and the buy most of your food crop? _____
7. How do you rate the level of affordability of the crop market prices to your household in 2007? (Unaffordable/expensive=1, Somewhat Affordable=2, Affordable=3)
8. Did your household face food shortage over the last 12 months? (No=0, Yes=1).....
9. If yes to # what is the **main** cause to your food shortage? Production failure=1, Lack of money to purchase =2, Lack of support =3, high prices of food =4, other_____
10. **If your household experienced food shortage**, during which season such a condition most prevail? (Winter=1, summer=2, autumn=3, spring=4, through out a year =5).....
11. What are the coping mechanisms that you employ to food shortage? Rely on saving=1, Leasing out land=2, Selling livestock=3, Compromise expenditure on non-food items=4, Sell firewood and charcoal=5, borrowing food=6, Migration =7.....

Household Food (In) Security Access Scale (HFIAS) (NOT DURING FASTING!) (LACK OF RESOURCE BEING CONCEPTUALIZED AS LACK OF MONEY, FOOD PRODUCTION FOR OWN CONSUMPTION, PHYSICAL MEANS TO ACQUIRE FOOD OR TRANSFER)

S.No.	Occurrence question	Response Options (Encircle the code)	If YES, How often did this happen?	Code
1.	In the past twelve months, did you worry that your household would not have enough food?	0= No (SKIP TO Q2) 1=Yes	1 = Rarely 2 = Sometimes 3 = Often	
2.	In the past twelve months, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (SKIP TO Q3) 1=Yes	1 = Rarely 2 = Sometimes 3 = Often	
3.	In the past twelve months, did you or any household member have to eat a limited variety of foods due to a lack of resources? Ex. Monotonous diet	0 = No (SKIP TO Q4) 1=Yes	1 = Rarely 2 = Sometimes 3 = Often	
4.	In the past twelve months, did you or any household member have to eat some foods that you really did not want to eat	0 = No (SKIP TO Q5) 1 = Yes	1 = Rarely 2 = Sometimes 3 = Often	

	because of a lack of resources to obtain other types of food?			
5.	In the past twelve months, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? Ex. Small meal in than what the child want	0 =No (SKIP TO Q 6) 1=Yes	1 = Rarely 2 = Sometimes 3 = Often	
6.	In the past twelve months, did you or any other household member have to eat fewer meals in a day because there was not enough food? Ex only once or Skipping	0 = No (SKIP TO Q 7) 1=Yes	1 = Rarely 2 = Sometimes 3 = Often	
7.	In the past twelve months, was there ever no food to eat of any kind in your household because of lack of resources to get food? Ex. empty store	0 = No (SKIP TO Q8) 1 = Yes	1 = Rarely 2 = Sometimes 3 = Often	
8.	In the past twelve months, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (SKIP TO Q9) 1 = Yes	1 = Rarely 2 = Sometimes 3 = Often	
9.	In the past twelve months, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No 1 = Yes	1 = Rarely 2 = Sometimes 3 = Often	

Annex 1b. Checklists for Focus Group Discussion

Livelihood activities undertaken in your area

Agricultural related and nonagricultural livelihood strategies (Intensification, extensification and diversification)

Methods of increasing crop production and livestock development

Practices of irrigation and benefits

Non-farm livelihoods and their contribution of non-farm livelihood in maintaining rural livelihood

Do you think that livelihood activities in your area are open to all households residing in your kebele? Why do you think? What are the entry barriers for households not to involve in better livelihood combinations?

The role of extension, market and credit service in improving livelihood

Predicaments which preclude the productivity of agriculture (Credit, extension, market,, environmental vagaries). Describe the effect of drought in the area.

Dominant social relations used by farmers to reduce vulnerability in livelihoods

Trends of rural assets (land, forest, labor, and livestock)

Challenges posed by cement factories

Food security situation and the trend of accessing food

The effects of livelihood strategies on food security

Key Informant Interview Guide for Model Farmers

Describe your livelihood (Intensification, extensification and Non-farm businesses)

What are agricultural products your household produce? Indicate them per hectare. What factors contribute to your productivity? (Financial, technology, human, natural capital and social ties).

Features that make you a model farmer

Would you say farming is a profitable enterprise to pursue? Explain your reasons. What do you think are the challenges to the viability of smallholder farming in your area?

Would you say your household is food secure throughout the year? Why? What do you think is the contribution of each livelihood activities in your effort to secure food for your household?

In-depth interview guide for households affected by the development activities

Your Kebele _____ What is your total household size?

Sex _____, Age _____

Family size _____, Number of dependents _____

When did you lost your land? How many hectares did you lose? What is the type of land your household had lost? (Grazing, water land, farm land, tree or residential area).

What were your risk management strategies you had undertaken?

What were the livelihood activities of your household before losing a land? What are your livelihood sources at present?

What is the main source of your food at present? Is that reliable? How you supplement your living in order to secure your food needs?

What are the impacts of the development activities like cement factories on the livelihood activities and efforts of your household to secure food?

Key informant interview for Extension Workers

Number of the farmers in this area across wealth category?

What are the parameters of wealth delineation in this particular Kebele (who is poor, medium, rich)? Does this has relation with the livelihood activities of rural households? Briefly explain.

What are the dominant agricultural activities practiced in the area? (**Intensification, extensification and diversification**) What are the main agricultural products that characterize the Kebele?

Describe the practices of irrigation, products and benefits to the overall productivity.

Who are the beneficiaries of agricultural extension? What services are available? Utilization level? Credit, seed, training and chemicals? Do you think that the expected outcomes are maintained, why?

What are the nonfarm activities that are pursued by households in the area? Do you think that multiplying means of living rescues agriculture and enhance food security?

What do you think are the food security situation of the kebele? What does the trend in food production, access and stability indicates?

What do you think are the challenges for small holder farmers in this area?

Please describe rural resource competitions between the development activities (cement factories) and small holder farming? Consider the forward and backward linkages that policy upholds; the nature of industry commenced in the study area and the effort to ensure food security?

Key Informant Interview Guide for Woreda Agricultural and Rural Development Officers

Position/Responsibility _____

Would you please describe rural livelihood activities in the woreda

Land use pattern, productivity and irrigation practices

Social service and farm input delivery for the rural population. What are the plans and successes with this regard? What are the bottlenecks still?

Credit provision

Trends of resources like land and labor

Predicaments of the smallholder agriculture (Historical occurrence of floods, droughts, epidemics, local environmental trends and cycles)

The expansion of investments and livelihood of small farming in the woreda.

Food security profile at woreda level Which segment and agro ecology is found susceptible? Elucidate with respect to their livelihood strategies and vulnerability level (you may point in to reports from kebeles).

In-depth interview guide for Case Studies

Sex: _____

Age: _____, Educational Status: _____

Marital status: _____, Family size: _____

Kebele _____, Agro-ecology: _____

Household livelihood activities, total monthly income from each activities

Land ownership, land use pattern, size, adequacy and protection practices

Trends in land ownership and challenges of landlessness

Livestock keeping, ox ownership and predicaments of livestock subsector

Access to credit service and market

Households' largest expenditure and the performance of market

Agricultural extension service utilization and bottlenecks

Availability and affordability of social service; road, water, communication, health center, and education

Experience of drought and mitigation practices through social networks

Food security status, trends of food access and the contribution of alternative livelihood

Observation guides

Land use patterns (irrigation, investment, expansion of farm land, degradation)

Road (development, accessibility, means of transport mostly used, bridges)

Water sources, protection, schools, and health centers areas.

Market places (settings, types of crops, livestock, actors, and transactions)

Sources of energy of households, communication facilities

Housing condition (structure, partition, type and quality), Farmers training centers

Livelihood activities around Derba cement factory

Farmland surrounding cement factories, quarry areas, construction.

Appendix 2: Additional tabular presentation of data

2.1. Reasons and patterns of pursuing non-farm livelihood activities

Patterns of participation in non-farm livelihood		
Patterns of participation in nonfarm livelihood	Frequency (N=113)	Percentage (%)
Temporarily/casually	15	13.2
Seasonally/as a par time activities	45	39.8
Permanently	53	47
Reason(s) for participating in non-farm livelihood activties		
Reasons for participating in non-farm livelihood activties	Frequency (N=113)	Percentage (%)
Have no other means of living	33	29.2
Because of low productivity of farming	41	36.3
Have small land to rely on farming	58	51.3
Uncertain agricultural performance	46	40.7
To increase cash saving	33	29.2
Due to attractive nonfarm wage	32	28.3
Because of having skill other than farming	28	24.8
Due to opportunity available in my vicinity	25	22.1

i Dichotomy group tabulated at value 1.(Multiple response)

2.2. Reason for not using credit

	Frequency(N=153)	Percent
No credit service in the area	30	19.7
High interest rate	18	11.8
Fear of indebtedness	36	23.0
Lack of collateral	32	21.1
Lack of awareness	21	13.8
I don't need it	16	10.5

2.3. Benefits gained from extension

Benefits	Lowland	Midland	Highland	Total (N=146)^y
Fertilizer	24	53	52	129 (88.4)
Improved seeds	5	15	23	43 (29.5)

Pesticides	25	33	37	95(65.1)
Periodic visits and Advices	4	14	28	46(31.5)
Post-harvest loss management	2	5	11	16(11)
Hybrid Livestock	0	15	11	26(17.8)
Skill development training	3	7	17	27(18.5)
Market linkages	0	3	9	12(8.2)

^y those respondents who use at least one of the agricultural extension service services

2.4. Experience of Crop failure due to drought

Experience crop failure	Frequency (N=177)	Percentage (%)
No	62	35.0
Yes	115	65.0
Experience distorted cropping schedule		
Cropping schedule affected	Frequency (N=177)	Percentage (%)
No	58	32.8
Yes	119	67.2

2.5. Major problems of livestock keeping

Problems	Frequency (N=165)	Percentage (%)
Shrinking grazing land	53	32.1
Animal health problems	32	19.4
Water inaccessibility	50	30.3
Shortage of improved breeds	18	10.9
Poor price of livestock market	12	7.3

2.6. Households' largest expenditure

Larger Expenditure	Frequency (N=215)	Percentage (%)
Food	98	45.6
Medical Expenses	11	5.1
Children cloth and schooling	28	13.0
Farm implements and tax	56	26.0
Ceremonies	7	3.3
Labor wage, Animal fodder Land rent	15	7