

**CHOICE OF LIVELIHOOD STRATEGIES by SMALLHOLDER
FARMERS in BOSET WOREDA, EAST SHOA ZONE, OROMIA
REGION, ETHIOPIA**

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**By
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APPROVAL SHEET
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As Thesis Research advisor, I hereby certify that I have read and evaluated this thesis prepared, under my guidance, by Elias Negera, entitled: “CHOICE OF LIVELIHOOD STRATEGIES AMONG SMALL HOLDER FARMERS in BOSET WOREDA, OROMIA REGION, ETHIOPIA” I recommend that it be submitted as fulfilling the Thesis requirement.

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DEDICATION

I dedicate this Thesis Manuscript to my parents Negera Jemama, and Bizu G. Ararsa, my wife Hawi Beyene and my son Milki.

STATEMENT OF THE AUTHOR

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BIOGRAPHICAL SKETCH

The author was born in February 1984 in Dembi town, Ilu Aba Bora zone of Oromia regional state. He started his education at Agaro Primary School and completed his elementary education Dire Incini Primary school in west Shoa, Oromia Region. He completed his secondary education at Ayer Tena High School in Addis Ababa. He completed preparatory education in 2004 in Addis Ababa. Upon successful completion of high school studies, he joined Arbamich University in December 2004 and graduated with B.A. Degree in Economics in July 2007. He briefly worked as Economics Teacher in Munesa Woreda Preparatory School for five months and as Budget and planning expert in Akaki woreda then Bureau of Economic Development and Finance for two months in the year 2008. From 2008 to date the author is working in World Vision Ethiopia serving in various capacities and currently serving as Food Assistance Manager on a USAID funded food assistance program working with the Ethiopian government productive safety net program.

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LIST OF ACRONYMS

ARDO	Agriculture and Rural Development Office
BoARD	Bureau of Agriculture and Rural Development
BoFED	Bureau of Finance and Economic Development
CSA	Central Statistical Agency
DFID	Department For International Development
FAO	Food and Agriculture Organization
FGD	Focus Group Discussions
GDP	Gross Domestic Product
HHH	Household head
IFAD	International Fund for Agricultural Development
KA	Keble Administration
LS	Livelihood Strategy

MoA	Ministry of Agriculture
NGOs	Non-Governmental Organizations
PADETES	Participatory Agricultural Demonstration and Training Extension System
SL	Sustainable Livelihood
SLA	Sustainable Livelihood Approach
SSA	Sub Saharan Afrika
UNDP	United Nations Development Program

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CHOICE OF LIVELIHOOD STRATEGIES by SMALLHOLDER FARMERS in BOSET WOREDA, EAST SHOA ZONE, OROMIA REGION, ETHIOPIA

ABSTRACT

Majority of smallholder farmers in Ethiopia pursue a dominant livelihood strategy mostly complemented by a second less dominant livelihood strategy. Choice of livelihood strategies is mostly constrained by shrinking natural capitals and adverse changes in climatic conditions that affects the outcomes from the adopted livelihood choices. In the face of such changes, comprehending the driving factors for the choice of current livelihood strategy is crucial to having objective information on rural livelihoods to make an informed approach in planning and executing rural livelihood policies. This study aims to empirically measure factors affecting choice of livelihoods strategies in Boset Woreda. Household level cross sectional data in production year 206/17 were collected from 200 randomly selected respondents. Data was collected using structured questionnaire, key informant interview and focus group discussion. Descriptive statistics and econometric model (Multivariate probit model) were used to analyze the factors that determine household's choice of livelihood strategy. The study found out that crop farming and Livestock rearing livelihood strategies are the most widely pursued livelihood strategies in the study area. The multivariate probit model found out that out of the 12 explanatory variables used for the study: Age of household head, farmland size and credit access have positively influenced households choice of crop farming livelihood strategy, while land size, age of household head and input use has negatively

influenced households decision to pursue non-agriculture livelihood strategies. The study also found out that the share of non-agriculture livelihood strategy among surveyed households comprises 39% of the livelihood choice by the respondents reporting to follow a wide range of off farm and non-farm income sources.

Key words: Livelihood strategies, Smallholder farmer and Boset Woreda

1.

INTRODUCTION

1.1. Background

East Africa had the largest proportion of the rural population (79.1 percent) in Africa (FAO, 2014). The region's agricultural production depends on diverse agro-ecological and farming systems where farmers grow a wide range of crops and keep different types of livestock for their livelihood strategies, which is poorly developed. As a result the region is highly challenged by poverty, hunger and environmental sustainability (Reynolds et al., 2007).

Most of SSA smallholder farmers use small-scale rain-fed agricultural system, which categorize them as; the poorest, least educated, poorly linked to markets, most vulnerable to non-conducive policies and surrender more severely to unfavorable environmental conditions such as draught (World Bank, 2007). In order to overcome the challenges, the rural community usually partakes in a number of strategies, including agricultural intensification, and livelihood diversification, so as to attain food security though still the challenge remains. (Carswell, 2000).

More specifically, in Ethiopia agriculture still remains the main pillar of the economy, which contributes 40% GDP, more than 80% of employment opportunities and over 90% of the foreign exchange earnings of the country. It serves as the primary means of livelihoods (MOA, 2010). According to FDRE, (2010), nearly 55 percent of all smallholder farmers operate on one hectare or less. Due to the smaller farm size and low return from farming activities, majority of rural households are exposed to food insecurity and chronic poverty. Poverty in Ethiopia has economic, political, demographic, geographic, environmental, and policy roots leading to low income and productivity, weak capital accumulation and investment, high levels of unemployment and underemployment (Abu, 2013).

A livelihood strategy is the process of choosing activities and asset investment for maintaining and improving livelihoods. Understanding this process requires measuring households' assets, activities and outcomes and then evaluating the context in which households form strategies. Interventions designed to improve rural livelihoods must necessarily focus on the context in

which households operate and create an environment that enable households to improve their condition (Ellis, 2000).

The Ethiopian government formulated a smallholder intensification extension programme known as Participatory Agricultural Demonstration Training Extension System (PADETES) to attain increased yield on smallholder farmer plot. Government intervention in the smallholder sector (including PADETES) was required to deal with the problem of low agricultural productivity (especially labor and/or land), shortage of productive farm land (i.e. through enhancing land productivity), chronic rural poverty, high natural resource degradation, and a self-reinforcing situation among these problems, it was argued (Samuel, 2006).

Boset woreda is found in the Rift Valley Maize and Haricot Bean (RVM) Livelihood zone according to Household Economy Approach and Cost of the Diet classification published in 2008. The main economic activities of the livelihood zone are crop production followed by livestock rearing. Crop production is rain fed with limited access for irrigation in some villages. Sandy and sandy clay loams are types of soil that are moderately fertile. The livelihood zone has got bimodal characteristics with the very important long Genna season (June-Sept) and the short rainy Afrasa season (February-Mid April). Land preparation and cultivation are done by ox plough. The main crops grown are maize, haricot beans and teff. Maize is grown for consumption while teff and haricot bean are sold. Although the livestock is not the major source of income, the households have experience of rearing cattle, goat and sheep. The very poor do not have cattle or ox. Livestock sales (cattle and shoats), livestock products like butter, skin and eggs are sold to generate cash. Oxen are replaced from their own herd or purchase and cows are replaced from their own herd. Looking after cattle and shoats are the responsibility of men and children who graze the animals in the surrounding grassland and around the farmland. The problem of accessing grazing land and credit services prevents the poorer households owning more livestock. The agricultural activities that require most labor in the livelihood zone are weeding and harvesting and it is the activity that the middle and better-off groups pay for. Crop diseases/pests include: stalk borer which affects maize, sorghum and haricot beans; rust which affects potato and smut which attacks wheat and barley. The households access the spray chemicals from the market to control these pests and disease. To

boost the crop production, inputs like fertilizer, improved seeds and pesticides are used. (HEA, 2008)

The types of activities practiced and strategies followed by a household may lead to either sustainable (desirable) or unsustainable (undesirable) livelihood outcomes. Poverty and food insecurity are among the main undesirable livelihood outcomes. Unsatisfactory livelihood outcomes may be the result of several factors which often interact, including low levels of livelihood assets, high degree of vulnerability to external shocks, and insufficient livelihood support from surrounding institutions (e.g. local government, financial markets) (FAO,2009). The constraints of the rural households in choosing livelihood strategies that will lead them to achieve food security goal should not be put aside since food security problem cannot be overcome by simply concentrating on the farm sector alone because the contribution made by non-agricultural sector to rural households is significant (Adugna, 2008).

In general, understanding the complex and the various processes through which livelihoods are constructed is imperative to mitigate the extent of rural poverty and food insecurity. Livelihood strategies frequently vary between individuals and households depending on differences in asset ownership. Hence, assessing rural livelihood strategies pursued by smallholder farmers and the factors that lead them to make a decision for specific livelihood strategies at a grass root level is important to update policies aimed at promoting successful and sustainable livelihood strategies at macro and micro level.

1.2. Statement of the Problem

Most poor rural households depend on agriculture as the main source of their livelihoods and hence rely on the productive use of land. However, livelihood sources have now become diverse across and within countries in which rural households engage in farming, agricultural wage labour, employment in rural non-farm economy and migration (Tsegaye *et al.*,2012). Despite progress witnessed in reducing poverty in some parts of the world over the past couple of decades, dealing with persistent rural poverty has continued to constitute the economic development agenda of sub-Saharan Africa (IFAD 2010).

In the context of rural Ethiopia, nonetheless, livelihoods are fundamentally grounded in the agricultural sector and it can be argued that poverty has its roots in the notion of access to resources (especially the distribution and productivity of land) and vulnerability of livelihoods to shocks (especially drought). Therefore, the production and reproduction of rural poverty in the country cannot be de-linked from land and from other agricultural resources (Tsegaye *et al.*, 2012). Nearly 55 percent of all smallholder farmers operate on one hectare or less. Due to the smaller farm size and low return from farming activities, majority of rural households are exposed to food insecurity and chronic poverty (FDRE, 2010). The evidence from FAO (2010), states that about 61 percent people were undernourished in Ethiopia. It is increasingly becoming clear that the agricultural sector alone cannot be relied upon as the core activity for rural households as a means of improving livelihood and reducing poverty. One phenomenon that is gaining prominence in the rural development literature is the promotion and support for non-farm diversification opportunities (Stifle, 2010).

Livelihood strategies are at the center of development. However, identification of the numerous factors that determine the abilities of rural household's choice of livelihood strategies in Ethiopia needs a systematic intervention approach to decrease the threat over the poor (Adugna, 2008). Agricultural sector is not capable to support a rapidly increasing rural population at its prevailing state of technology, labor productivity and policy environment (Abu, 2013)

The primary dependence on subsistence crop production in Ethiopia, harvest failure leads to household food deficits, which in the absence of off-farm and /or non-farm income opportunities, and/or other means such as timely food assistance, leads to asset depletion and, increasing levels of destitution at the household level (FDRE, 2002). The determining factors of poverty are diverse one of which is the lack of options to diversify livelihood activities and strategies. (Carswell, 2000). Never the less in areas like Boset Woreda, some households attempt to diversify their livelihood to overcome the recurrent challenges of poverty and food insecurity, while still consider percentage of households fail to do so. In this connection, there has been no formal attempt made to investigate as to what are the primary dividing factors for households to diversify their livelihood strategies. For the purpose of this research a focus

group discussion with male and female groups in sample selected Kebeles of Tribireti and Buta Dankore is conducted to categorize the major livelihood strategies pursued by smallholder farmers in Boset woreda. A key informant interview with woreda agriculture office experts and Kebele development agents is made to verify and strengthen the major livelihood strategies adopted by smallholder farmers in Boset woreda. Based on the results of the focus group discussions and key informant interviews, crop production, livestock rearing and non-agricultural activities composed of off farm and non-farm are identified the major categories of livelihood strategies among smallholder farmers in the woreda.

This study has focused on assessing choice of livelihood strategies by smallholder farmers and factors influencing choice of livelihood strategies in Boset woreda at household level, the result of which can be used by development actors as well as local government stakeholders in their policy and program intervention in supporting smallholder farmers' livelihoods.

1.3. Research Questions

The study tried to address the following research questions:

1. What is the current livelihood strategy widely pursued by small holder farmers in the woreda?
2. Are existing livelihood strategies in the woreda affected by changes in natural and socio economic factors influencing livelihoods?

1.4. Objectives of the Study

The general objective of the research was to assess choice of smallholder farmer's livelihood strategies and factors influencing choice of livelihood strategy in Boset Woreda.

The Specific Objectives were:

1. To identify the relationship between smallholder farmers choice of livelihood strategies in the study area.
2. To assess the status of livelihood capitals available to smallholder farmer in their choice of livelihood strategies.

1.5. Significance of the Study

It is important to understand the livelihood situation of smallholder farmers at a grass root level. This study will be conducted at micro level and also will focus on the livelihood strategies adopted by smallholder farmers given the livelihood assets in their area. This will contribute to informed decision making at local and national level in order to minimize the level of vulnerability and poverty by providing objective and scientific information on household existing livelihood strategy and its determinants. In the first place, study at grass root level investigates demographic, economical, institutional factors in livelihood strategies choices about household livelihood strategies and the reason behind their choice will help to design intervention that have greater impact at micro level for development actors and local government bodies. Moreover, policy makers that seek to build sustainable and local based livelihood approach especially for food insecure area will get relevant information for their design. In general, the study will be useful to policy makers and executive officials and stakeholders at community level to identify the existing livelihood strategies at local level and the reason behind the various livelihood strategies adopted by households. Finally, that study can be as an insight for further research and investigation regarding livelihood strategies adopted by smallholder farmers.

1.6. Scope and Limitations of the Study

The study was limited to the study of theories, empirical findings and factors related to livelihoods strategies of smallholder farmers. The study investigated demographic, economic, environmental and institutional factors influencing the livelihood strategies adopted by smallholder farmers with a geographic focus of only Boset Woreda, East Shoa Zone, Oromia Regional state. The study was conducted using cross sectional data collected from 200 respondents in the year 2016.

1.7. Organization of the Thesis

The thesis is organized into five chapters. The first chapter introduces background and justification of the study, statement of the problem, objectives, significance, scope and limitations of the study. The second Chapter depicts literature reviews and the model of conceptual framework. In the third chapter, research methodology is discussed with reference to describing the study area, sample and sampling techniques, sources and methods of data collection, and data analysis. Result and discussion of the research findings is presented in chapter four. Finally summary of major findings of the study, conclusions and recommendations are presented in the last chapter of the thesis.

2. LITERATURE REVIEW

In this detail of literature reviews on the concept of livelihoods and choice of livelihood strategy, conceptual framework and empirical studies on livelihood strategies and choice of livelihood strategies are presented.

2.1. Concepts and Origins of Livelihood

Many earlier development approaches assumed that rural society was homogenous (in other words, that there was no differentiation between households in rural areas) and that households had single-purpose economies (in other words, that they only had one way of making a living). As a result, development agencies tended to focus on narrow, sectoral, production-orientated strategies that often bypassed those most at risk and failed to recognize that poor households have multiple economic strategies. One of the key findings that flowed from participatory research and appraisal was a much more subtle understanding of livelihoods and the different elements that they combine Periphery, Oxfam (2002).

The livelihood approach dates back to the contributions of several scholars between the mid-1980s and the early 1990s as a new way of thinking about the objectives, scope and priorities for development. Its emergence had all the qualities of a classic “paradigm shift” (Solesbury, 2003). By the early 1990s, certain donor agencies had seen sufficient merit in livelihoods approaches to begin employing the approach in their work (Solesbury, 2003). The approach started from the premise that the poor do not just have needs, they also have assets, primarily labor power but also other assets of various kinds, and they try to earn a livelihood in a variety of ways by using these assets (Osmani, 2003). Particularly, 1992 could be named as the starting year of the livelihood focus in development cooperation (Ashley and Carney, 1999).

The livelihood approaches as a whole are focused on the household as the basic unit of analysis and build from that starting point to integrate the household into other levels within and beyond the local community (Chambers, 1983 & 1993).

The UK Government endorsed it in its 1997 White Paper on International Development and between 1998 and 2002 the Department for International Development (DFID) placed considerable emphasis on the development and rolling out of the approach (DFID, 1999).

Livelihoods approaches are based upon a conceptual framework to aid analysis of the factors affecting peoples' livelihoods, including their priorities (i.e., livelihood outcomes), their access to assets and their ability to put these to productive use, the different strategies they adopt, the policies, institutions and processes that shape their access to assets and opportunities, the context in which they live, and factors affecting vulnerability to shocks and stresses (Romano, 2010)

Livelihoods are formed within social, economic and political contexts. Institutions, processes and policies, such as markets, social norms, and land ownership policies affect our ability to access and use assets for a favorable outcome. As these contexts change they create new livelihood obstacles or opportunities IRP (2010).

The word livelihood defined by different authors and organizations in different time, in fact the first definition was formulated by Chambers & Conway (1992) which defined livelihood as comprising the capabilities, assets (stores, resources, claims and access) and activities required for a means of living.

According to Elis (2000) a livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household. Livelihood refers the ways in which individuals or households make sure that there is enough food on the table, and provide the basic necessities for a good life (DEAT, 2003).

2.2. Sustainable Livelihood Framework

The sustainable livelihoods idea was first introduced by the Brundtland Commission on Environment and Development as a way of linking socio economic and ecological consideration in a cohesive, policy- relevant structure, and 1992 United Nation Conference on Environment

and Development expanded the concept, advocating for the achievement of sustainable livelihood as a broad goal for poverty eradication (Krantz, 2001).

A household's livelihood is secure when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and productive asset base (Chambers and Conway, 1992). Standing from previous livelihood definition, which is, livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Carney, *et al.*, 1998), Ashley and Carney (1999) discuss the aims of sustainable livelihoods (SL) approach in development and poverty reduction through promoting development that is sustainable not just ecologically, but also institutionally, socially and economically and to produce genuinely positive livelihood outcomes (rather than concerning themselves with narrow project outcomes, with resources or with output).

There is no unified approach to applying the SL concept. Depending on the agency it can be used primarily as an analytical framework (or tool) for program planning and assessment or as a program in itself. There are, however, three basic features common to most approaches. The first is that the focus is on the livelihoods of the poor. The second is that the approach rejects the standard procedure of conventional approaches of taking as an entry point a specific sector such as agriculture, water, or health. And finally, the SL approach places great emphasis on involving people in both the identification and the implementation of activities where appropriate. In this regard, different development agencies using the SL approach as a strategy towards poverty alleviation. They also use similar definitions of what constitutes sustainable livelihoods. For instant UNDP and CARE use it to facilitate the planning of concrete projects and programs, while for DFID the SL approach is more of a basic framework for analysis than a procedure for programming, and it is also used to assess and review on-going projects and programmes to make them more sensitive and responsive to the conditions and needs of the poor (Krantz, 2001).

The livelihoods framework is a tool to improve our understanding of livelihoods, and one of the key components of the SLA and it helps to understand the complexities of poverty particularly the livelihoods of the poor. It help to distinguish the main factors that affect people's

livelihoods, and typical relationships and it can be used in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities. The framework provides a checklist of important issues and sketches out the way these link to each other; draws attention to core influences and processes; and emphasizes the multiple interactions between the various factors which affect livelihoods. The framework is centered on people. It does not work in a linear manner. Its aim is to help stakeholders with different perspectives to engage in structured and coherent debate about the many factors that affect livelihoods, their relative importance and the way in which they interact (DFID, 1999). It should be known that the livelihoods framework is not intended to depict reality in any specific setting. Rather, it is intended as an analytical structure for coming to grips with the complexity of livelihoods, understanding influences on poverty and identifying where interventions can best be made (Kollmair and Gamper, 2002). The individual components of the framework are described in detail in the subsequent section.

Sustainable livelihoods framework

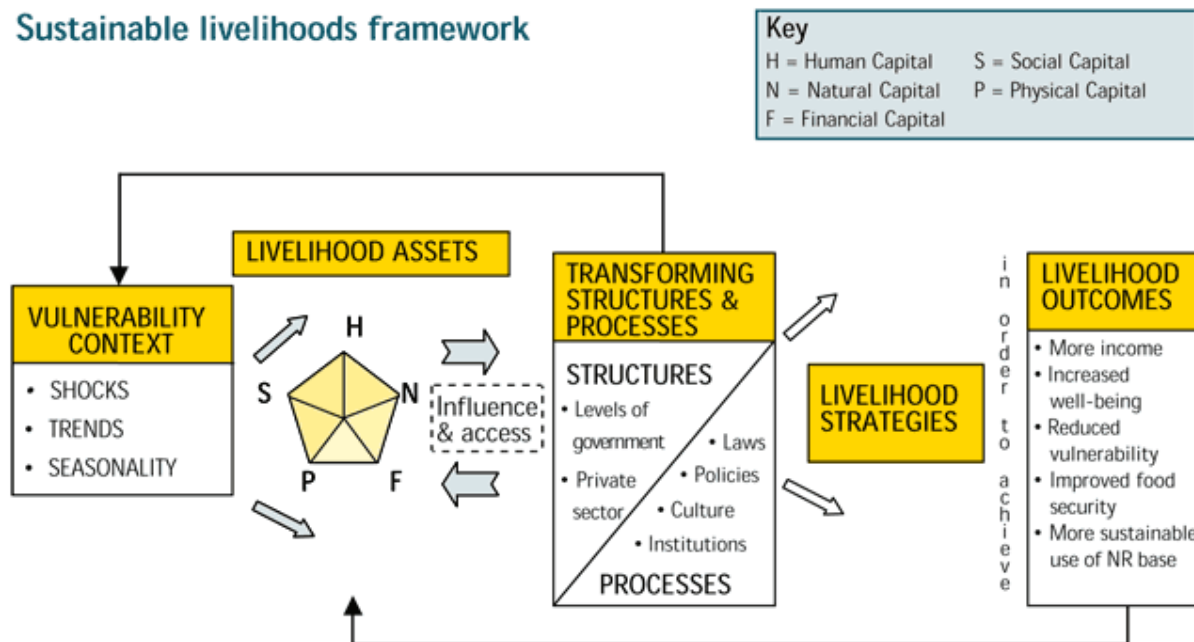


Figure 1: Sustainable livelihoods model
 Source: DFID, 2001

2.2.1. Vulnerability Context

The vulnerability context within which people pursue their livelihoods includes trends (for example, economic or resource trends), shocks (for example, conflict, economic shocks, natural shocks, etc.), seasonal fluctuations in prices, production, health, employment opportunities.¹⁴ These factors can have a direct impact on people's assets and on the options available to them to pursue beneficial livelihood strategies. The vulnerability context of poor people's livelihoods is usually influenced by external factors outside their direct control and is dependent on wider policies, institutions and processes (Romano et al, 2010). It is a concept that combines exposure to a threat with susceptibility or sensitivity to its adverse consequences where people have no or little control over it. There is mutual reinforcing relationship between vulnerability and food insecurity. Vulnerability is fundamentally about risk, uncertainty and lack of security. It is the susceptibility of individuals or households to specific risk events. Risk refers to the

likelihood of shocks and stress that can be either external (weather-based events, market crises, *etc.*) or internal (sickness and death) to the household (DFID 1999).

2.2.2. Livelihood Assets

Livelihood Assets are the resources on which people draw in order to carry out their livelihood strategies (Farrington *et al.*, 2002). The members of a household combine their capabilities, skills and knowledge with the different resources at their disposal to create activities that will enable them to achieve the best possible livelihood for themselves. Everything that goes towards creating that livelihood can be thought of as a livelihood asset (Meser and Townsley, 2003). Synonymously, the term capital is used as livelihood assets. It refers to tangible or intangible assets that are held by a person or household for use or investment; wealth, in whatever form, capable of being used to produce more wealth; any source of benefit or assistance. Various forms of capital can be accumulated, exchanged, expended and lost, thereby affecting a household's level of livelihood security, quality of life, and its options for coping strategies (CARE, 2001).

Different authors and organization have categorized livelihood assets. For instance, Chambers and Conway (1992), classified livelihood assets into three: tangible(stores and resources); intangible (claims for material, moral or practical support); and opportunity to access resources; United Nations Development Program (UNDP,1998), grouped livelihood assets into six: human, social, natural, physical, economic and political capitals; DFID (1999) involves human, social, natural, physical, and economic capitals as categories of livelihood assets; CARE (2001), categorize as human, social and economic assets; and Moser, (1998) classified livelihood assets as labor, economic and social, infrastructure, housing, household relations and social capital. The livelihood assets are human capital like age, education, gender, health status, household size, dependency ratio and leadership potential (Farrington et al, 2002; Bezemer and Lerman, 2002).

Natural Capital

Natural capital is the term used for the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived. This produces nature's goods and services, and comprises food (both farmed and harvested or caught from the wild), wood and fiber; water supply and regulation; treatment, assimilation and decomposition of wastes; nutrient cycling and fixation; soil formation; biological control of pests; climate regulation; wildlife habitats; storm protection and flood control; carbon sequestration; pollination; and recreation and leisure (DFID, 1999; Rengasamy's 2009). Natural capital is very important to those who derive all or part of their livelihoods from resource-based activities. Within the sustainable livelihoods framework, the relationship between natural capital and the vulnerability context is particularly close (DFID, 1999). Many of the shocks (fire, flood, earthquake and etc) that devastate the livelihoods of the poor are themselves natural processes that destroy natural capital (land, forest and etc). Land size is one of the main indicator variables through the process of assessing household natural capitals (Adugna, 2008; Berhanu, 2007; Fekadu and Gebrehiwot, 2012 and Tatek, 2012).

Social Capital

In the context of the sustainable livelihoods framework it is taken to mean the social resources upon which people draw in pursuit of their livelihood objectives. The social assets comprising social capital include norms, values and attitudes that predispose people to cooperate, networks and connections (patronage, neighbourhoods, kinship), relations of trust and mutual support, formal and informal groups, common rules and sanctions, collective representation, mechanisms for participation in decision-making, leadership, reciprocity and obligations; and mutually-agreed or handed-down. Social capital yields a flow of mutually beneficial collective action, contributing to the cohesiveness of people in their societies (DFID, 1999; Rengasamy's, 2009). When we look the relationship of social capital with others types of capitals and its effect on livelihood outcome, by improving the efficiency of economic relations social capital can help increase people's incomes and rates of saving (financial capital). Social capital can improve the management of common resources (natural capital) and the maintenance of shared infrastructure (physical capital) and facilitate innovation, the development of knowledge and sharing of that knowledge. Various proxies for social capital can be used, like membership in

agricultural cooperatives, and incidence of mutual help in hard times. (Bezemer and Lerman, 2003; Adugna, 2008; Tatek 2012).

Human Capital

The main characteristics of human capital are age, education, gender, health status, household size, dependency ratio and leadership potential, etc. (Bezemer and Lerman, 2003; Farrington *et al.*, 2002; Kollmair and Gamper, 2002). It is enhanced by their access to services that provide these, such as schools, medical services, and adult training. People's productivity is increased by their capacity to interact with productive technologies and with other people (social capital). Human capital has a great impact on the achievement of livelihood outcomes and other capitals. For instance, Health status is directly related to income/food security (with relevant knowledge), higher income is often reinvested in education and reduced vulnerability can reduce the birth rate (with knock-on effects on nutrition and labour). High levels of social capital can also substantially add to human capital since social networks facilitate innovation, the development of knowledge and sharing of that knowledge. Leadership and organizational skills are also important capital to making other resources more valuable. There is, therefore, a close relationship between different capital especially social and human capital. At a household level human capital is a factor for the amount and quality of labour available; this varies according to household size, skill levels, leadership potential, health status, etc (Rengasamy's 2009; DFID,1999). Berhanu, (2007) Adugna, (2008) Tatek, (2012) were the authors those took different human capitals like Age, educational level, gender, household size and dependency ratio as a indicator variable for their investigation at household level.

Physical Capital

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. Infrastructure consists of changes to the physical environment that help people to meet their basic needs and to be more productive such as roads, bridges, telecommunications, market infrastructure, transportation systems). Producer goods are manual and mechanized tools and equipment that people use to function more productively. Insufficient or

inappropriate producer goods also constrain people's productive capacity (DFID, 1999). To analyze the relationships between household livelihood strategy choices and physical capitals, input use, such as market distance were used as an indicator variables (Adugna, 2008; Tatek, 2012).

Financial Capital

Financial capital is defined as the financial resources that are available to people and which provide them with different livelihood options and it comprises the important availability of cash or equivalent that enables people to adopt different livelihood strategies (Kollmair and Gamper, 2002). There are two main sources of financial capital: available stock and regular inflow of money and regular inflow of money. Available stock can be held in several forms: cash, bank deposits or liquid assets such as livestock and jewelry. Financial resources can also be obtained through credit-providing institutions. The most common types of inflows are pensions, or other transfers from the state, and remittances the most common types of inflows are pensions, or other transfers from the state, and remittances (DFID, 1999). Credit access, receiving remittance are the indicators variables under the financial capital for investigation regarding the subject at household level (Berhanu, 2007, Adugna, 2008; Tatek, 2012, Fekadu and Gebrehiwot, 2012).

2.2.3. Policy and Institution

Policies are the general guidelines that govern resource use, whereas, institutions are the social cement which link stakeholders to access to capital of different kinds to the means of exercising power (DFID, 1999). Policies and processes that may influence both the choices that households make about using their assets, and the types and amount of assets that they are able to access. Policies, usually decided upon at different levels of government, will affect how households are able to take decisions or make use of the livelihood assets at their disposal. For example, policies for giving more responsibility to village-level institutions may give local people more influence over the decisions that affect them directly. Generally, the institutions and policies of the transforming structures and processes have a profound influence on creation

of access to assets, determination of access to assets and rates of household asset accumulation (DFID, 1999).

2.2.4. Livelihood Strategies

Livelihood strategies are the combination of activities that people choose to undertake in order to achieve their livelihood goals. They include productive activities, investment strategies and reproductive choices. A major influence on people's choice of livelihood strategies is their access to assets and the policies, institutions and processes that affect their ability to use these assets in order to achieve positive livelihood outcomes. Livelihoods approaches try to understand the strategies pursued and the factors behind people's decisions, to re-enforce the positive aspects of these strategies and mitigate against constraints. Policies, institutions and processes refer to the complex social, economic and political context within which people pursue their livelihood strategies (Romano *et al*, 2010).

Ellis also defined Livelihood strategies as the activities realized by household members (farm production, off farm activities, migration, etc.), resulting in outcomes such as food or income security and it include coping strategies designed to response shocks in the short term and adaptive strategies designed to improve circumstances in the long term. These strategies are determined by the assets and opportunities available and by the choice and preference of men and women. At village or community level, a single livelihood strategy could not apply, since different households will adapt different strategies according to their particular asset and asset status (Ellis, 2000 and Ellis *et al*,.2003).

2.2.5. Livelihood Outcomes

Livelihood outcomes are the goals to which people aspire, the results of pursuing their livelihood strategies, such as increased income, reduced vulnerability, increased well-being, improved food security, and more sustainable use of natural resources.

Livelihoods outcomes are important because they help the analyst to understand the results of peoples' livelihoods strategies in a particular context, why people pursue particular strategies and what their priorities are, and how people are likely to respond to new opportunities or

constraints (Romano *et al*, 2010). Livelihood Outcomes are the achievements or outputs of Livelihood Strategies (DFID, 2000). It is not, however, achieved for many of the poor whose primary day-to-day objective continues to be to secure enough food to eat (DFID, 2000). Activities lead to outcomes, and outcomes might be immediately obvious or only obvious over time.

2.3. Types of livelihood Strategies

Livelihood strategies have been classified according to different criteria. Scoones (1998) divide rural livelihood strategies into three broad types according to the nature of activities undertaken: agricultural intensification and extension, livelihood diversification, and migration.

Agricultural Intensification/Extension: These strategies mainline continued or increasing dependence on agriculture, either by intensifying resource use through the application of greater quantities of labor or capital on a given land area, or by bringing more land into cultivation or grazing. Technical developments in agriculture may also operate as a key determinant. The availability or not of this option, and the extent to which it is undertaken by the household, will determine in major part the need for, and the household resources available to, off-farm livelihood diversification.

Livelihood Diversification: Diversification here may be to broaden the range of on-farm activities (e.g. adding value to primary products by processing or semi-processing them), or to diversify off-farm activities by taking up new jobs. It may be undertaken by choice for accumulation or reinvestment purposes, or of necessity either to cope with temporary adversity or as a more permanent adaptation to the failure of other livelihood options. The former motivation might be associated with a wide income-earning portfolio to offset all future types of shocks or stress, whereas the latter would more likely be a narrower, rehearsed response to a particular type of common shock or stress.

Livelihood strategies are further classified under on farm and off farm activities that help households to acquire food and cash. Rural households also use combination of one or more

livelihood strategies to result reliable livelihood strategies; which may include predominantly farm, off farm and non-farm income sources, this are also varied by the households asset base, opportunity, and household characteristics (Frankenberger *et al.*, 1999, Rao *et al.*, 2004). Four types of livelihood strategies were explored by Tesfaye (2003) in Eastern Hararge. He categorized them as Economic activities, Investment strategies, Reproductive choice and Choice of place of residence (Migration). He further identified between land use strategies such as; crop land expansion and land use intensification, and livelihood diversification strategies within agriculture (diversification of crop and livestock), out of agriculture to off/nonfarm activities. Another researcher Berhanu (2007) in Southern Ethiopia, Gena-Bosa woreda explored four livelihood strategies which are Agriculture, Agriculture and migration, Agriculture and non-farm and Agriculture, non-farm and off-farm. Adugna (2008) in southern region, Boloso sore woreda identified four types of livelihood strategies namely, Agriculture alone, Agriculture + off farm, Agriculture+ nonfarm and Agriculture + nonfarm+ off farm. Tatek (2012) also identified four livelihood strategies in Oromia zone, Bereh district: Agriculture and migration, Agriculture and off-farm, Agriculture and non-farm and a combination of Agriculture +off farm + nonfarm.

2.4. Empirical Studies on Determinants of Choice of Livelihood Strategies

Several factors determine the ability of rural households to choose among livelihood strategies and livelihood diversification. Different studies concerning livelihood diversification in general and determinants of livelihood diversification in particular were carried out in different part of Ethiopia. For instance, Devereux (2000) found out that most Ethiopians are ‘subsistence farmers’ who have been forced to diversify into off-farm incomes to bridge their annual consumption gap, while some are effectively landless and depend entirely on non-agricultural sources of food and income, including food aid. The typical rural livelihood strategy combines crop and livestock agriculture, off-farm income-generating. Ellis identifies seasonality, risk, labor markets, credit substitution, and asset strategies (investment to enhance future livelihood prospects e.g. developing networks, education) as factors which might induce voluntary motives for the adoption of diverse livelihoods (Ellis, 2000).

Similarly, Meser and Townstey (2003) argued that different livelihood activities have different requirements, but the general principle was that those who were amply endowed with assets were more likely to be able to make positive livelihood choices. That is, they have chosen from a range of options in order to maximize their achievement of positive livelihood outcomes, rather than being forced into any given strategy. Thus, people's access to different levels and combinations of assets were the major factors that influenced their choice of livelihood strategies.

Abebaw (2003) in Dire Dawa revealed that family size, annual income, amount of credit received, irrigation use, age of household head, status of education, cultivated land size, livestock ownership and number of ox owned as the main determinants of food insecurity and livelihood strategies in the area. Tesfaye (2003) also revealed that in sufficient land holding, food self insufficiently, low revenue from sales of cash crop, the number of males in a household are positively and significantly associated with participation of rural households in off farm and nonfarm activities.

The study conducted by Adugna (2005) explored that participation in off-farm activities was mainly driven by demographic factors, whereas land and other asset ownership as well as crop income, together with demographic factors, affect intensity of off-farm activities. Initially female headed households and households with more land holdings subsequently realized less diversification into off-farm activities. On the other hand, families with larger initial crop income from main harvest season realized greater income share from off-farm activities. Brown et al., (2006), indicated that family size, farm size, access to credit, and household heads with secondary education were found significant in determining choice of livelihoods strategies.

Adugna, (2008) found out that sex of household head, age of household head, educational level of household head, Livestock holding, family size, agro ecology, land size owned frequency of extension agent contact, credit use, dependency ratio, membership to cooperatives and receiving remittance as the determinants of livelihood strategies to choose different types of livelihood strategies. Further observation of the data revealed that, off-farm activities (agricultural wage, land rent, and environmental gathering) were survival mechanisms pursued

mainly by the poor and less poor groups but not viewed as an opportunity that farmers engage in as a choice. Non-farm activities, such as rural craft was the main choice of the poor than the counterparts. Thus, off-farming activities seem more of a coping mechanism for the rural population than a way to accumulate wealth and reduce poverty. The poor tend to concentrate on off farm activities with low entry constraints (gathering, such as charcoal making and fire wood collection and wage). This result lead to the understanding of the challenges which prevent the poor and less poor from engaging in livestock production and more remunerative non-farm activities.

Gebrehiwot and Fikadu, (2012) in Gulomekeda District, eastern Tigray zone revealed that age, education, household size, dependency ratio, membership to cooperative, credit, remittance, market distance, are the factors to engage household in different livelihood strategies increases. Lack of access to credit remains the key problem in the district to potential diversification into non-farm and off-farm activities. And also the authors pointed out that access to credit plays a pivot role in strengthening smallholders' potential to diversify their livelihood strategies and cope with stresses like drought in the area.

Tatek (2012) is identified that sex, annual income and age of household head influenced negatively to choice of agriculture alone at different probability respectively, while distance to market correlate positively and significant at less than 10 percent probability level to choice of agriculture alone. Age, dependency ratio, education, family size household head, household remittance and distance to market were found positively related to choice of agriculture plus off farm plus nonfarm livelihood strategy at different probability level in their order. On the other hand, use of credit, land holding and livestock possession were related negatively to choice of agriculture plus off farm plus nonfarm livelihood strategy at different probability level. Sex of the household head, landholding and annual income of the household were found to be negatively correlation to choice of agriculture plus nonfarm livelihood strategy, while education level of the household head and distance to market center were positively related with the same choice at different probability level.

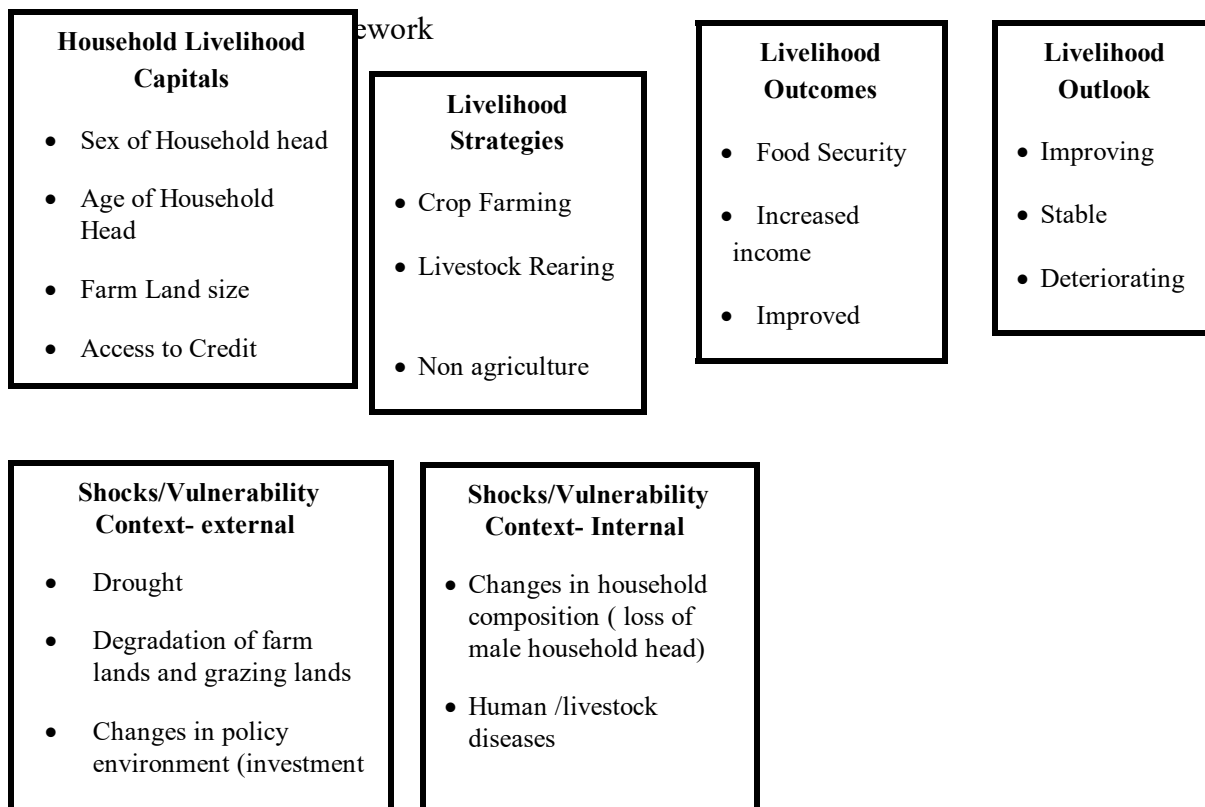
The review from the above paragraphs indicates that there are multiple and interrelated factors determining choices rural household livelihood strategy that might vary from one to other

contexts. Therefore, assessing area specific data and evidences on such important issues have great advantage in the facilitation of process of rural poor people poverty and food insecurity at a grass root level. and also it will help to design intervention that have greater impact at macro level policy that seek to build sustainable and local based livelihood approach especially for food insecure area.

2.5. Conceptual Framework

The study focuses on assessing existing livelihood strategies and identifying factors affecting smallholder farmers' livelihood strategies choices. There is a need to examine the interrelationship and interactions of various factors revolving around the livelihood strategy choice of smallholder farmers. Thus, the present study in analyzing livelihood strategies choices involved direct examination of the individual household's asset endowment (Figure 2). The key point in analyzing livelihood framework emphasizes understanding and being able to act on people's survival capabilities starts of first and for most with the assets that they own (Adugna, 2008).

In these studies it was reported that smallholders choose different types of livelihood strategies depending on heterogeneity in their livelihood assets base. Understanding the diverse and dynamic of any rural livelihood situation helps to identify appropriate strategies for intervention and to introduce new strategies that have greater impact on the reduction of household poverty level. The following conceptual framework includes components: assets (human, social, physical, financial and natural), the policies and institutions (credit, extension) and livelihood strategies (agriculture, off farm, nonfarm and migration).



Source: Adopted from FAO 2000

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

Geography and Location

Boset district is one of the 10 districts in East Shewa zone Oromia National Regional State Ethiopia, with an area of 1514 Km². In the north it borders by Minjar district of Amhara

regional state. In South it shares border with Arsi Zone, in East it border with Fantale, in West Adama and Lume districts. The capital town of Boset district is Olan Chiti town and located at about 25 Km in the east of Adama and 125 Km in the east direction from Addis Ababa; the capital city of Ethiopia. The district has 33 peasant associations and two-urban Kebele administration of which only two are mid land Kebeles and the rest 31 Kebeles are categorized as lowland Kebeles. The study will be conducted in five Kebeles, namely Dangore Tiyo, Furda Kusaye, Digaluwanga, Tribireret and Butadongore. The sample kebeles are selected randomly from among the total 31 lowland kebeles. Geographically, this woreda is predominantly level land with undulating features; almost 90% is less than 1500 meters above sea level.

Population Characteristics

According to the 2015 CSA population projection, the total population of the Boset woreda is estimated at 179, 659 among whom 92,966 are male and 86,693 are women. The district is also estimated to have a total area of 1514square km with a Population density of 107.8 people per Sq. km. According to the information obtained from district Finance and Economic development bureau, 91.5% of the total population is Oromo, 4.5% Amhara and 4% others. In terms of Religion, majority of the people are followers of Orthodox Christian and Waqefana (the indigenous religion of Oromo), while few are Muslim & Protestant (CSA, 2009).

Climate

The district lies in the great East African Rift Valley with an average temperature of 29⁰C. climatically; the district can be categorized mainly in to lowland which comprises about 90 % of the total land mass and mid-high land, which comprises about 10% of the total land mass.

The low land Kebeles experience frequent drought, and hence moisture stress is the binding problem for their agricultural production. While average annual rainfall is between 600 and 900 mm in the area. The district has a variety of land forms including vast plains, hills and mountains all over the area, which are continuously eroded by rain (BoFED, 2014).

Farming Practices

In Boset, maize, teff, sorghum, wheat, haricot bean, finger millet and barley are the major cereal crops grown by the majority of farmers. Teff is the main cash crop growing on less fertile sandy clay soil followed by Haricot bean and Onion. In addition to the cereal crops Carrot, Pepper, Tomato, Onion, Potato, Sugar Potato and cabbage are produced. Livestock production is the other component of farming system in Boset district, cattle, camel, donkey, sheep, goats and chicken are commonly reared by farmers. Moreover, few farmers practice bee keeping production.

Land Use

Land use system in the district is presented as cultivated land that constitute 27 % , Artificial forest land 1%, bush and shrubs land 59 % and land covered with others like town ,church and soon 13% of the total 151,406 ha area in the district(BoFED, 2014).

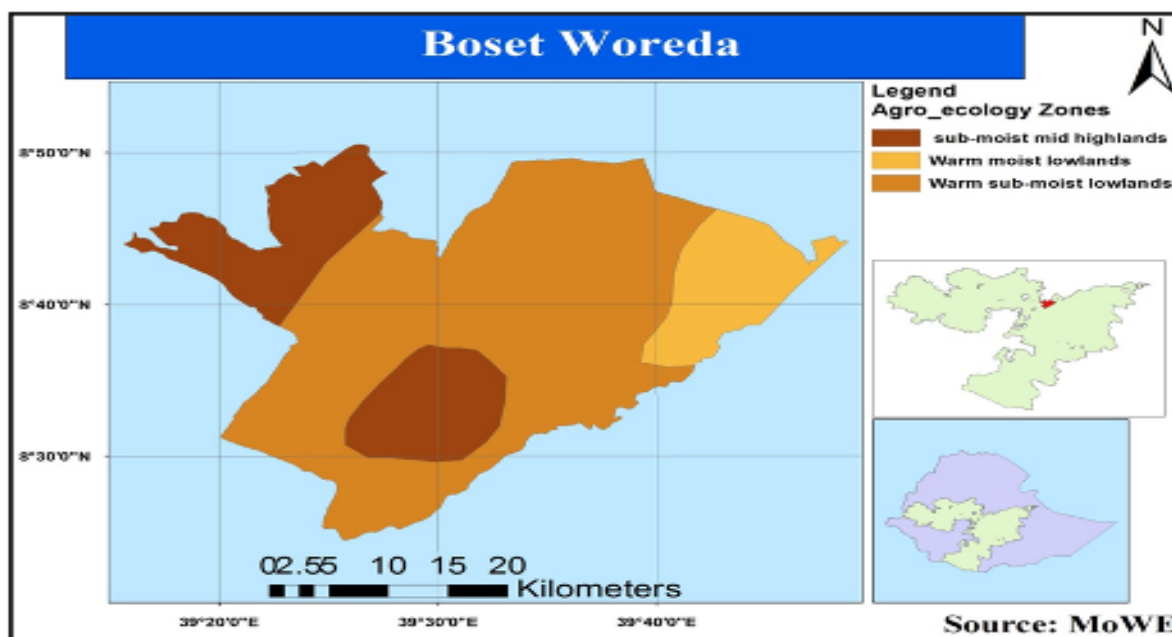


Figure 3. Location Map of study Area.

3.1.1. The Livelihoods of Boset Woreda

Based on the information gathered from different sectors in the woreda, the livelihoods of farmer in the woreda highly depend on subsistence agriculture; which comprises – mixed farming of crops and livestock. The livestock sector has highly supporting crop production and it also serve as the main criteria to categorize farmers' wealth and household security during emergency time such as crop failure. The woreda's livelihood is featured by the expansion of the sugarcane out-grower farming whereby significant number farmers transited to earning their livelihoods. However, the sugarcane out grower farming system which has taken a significant amount of land from crop cultivation and animal grazing seems not benefiting the farmers as there was no payment made to the farmers since 2011. Agriculture in the Woreda is characterized by lack of access and use of modern technology, low productivity, heavy dependence on rainfall and backward irrigation practices, deforestation (fuel wood and charcoal selling), and unsustainable use of natural resource. Under no technological options, such agricultural based livelihood systems hardly meet the day-to-day household earnings and getting out of their poverty status.

3.2. Sampling Techniques and Sampling Procedures

A simplified formula used by Yamane (1967) was applied to calculate sample size for this study. The formula is as below.

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

Where, n=Sample size, N= Total population size (total household size), and e= Level of precision. For this study a precision level of 0.08 is used based on the above formula, which produced a sample size of 156. To make use of the opportunity of larger sample size this study has used 200 sample households.

The study has employed two stage sampling methodology. At the first stage Boset woreda was purposively selected with an interest to study an area where livelihood strategies of small holder farmers are challenged by persistent food insecurity and vulnerable to adverse climatic change.

At the Second stage, in collaboration with the Woreda agricultural office five sample kebeles; 4 from lowland and one from mid land were selected randomly from the total 33 Kebeles of the woreda of which 31 are in lowland and two are in the mid high land agro ecology. Based on the agro ecology of the woreda, it was assumed for this specific study that all rural Kebeles represent the majority of the households in the woreda in terms of their socio economic and environmental description.

Table 1. Sample Kebele and Population size

Sr.NO	Kebele	Total Population	Household Size	Percentage	Sampled Household
1	Buta Dongore	931	190	4.7	10
2	Furda	6326	1291	31.7	63
3	Tribiret	2979	608	14.9	29
4	Dongore Tiyo	8820	1800	44.2	88
5	Digalu Wanga	907	185	4.5	10
Total		19,963	4,074	100	200

Source: Boset Woreda BOFED, 2014

To determine each sample Kebele shares in total sample household, probability proportional to size (PPS) method is used. Finally, 200 sample households were selected using simple random systematic sampling method.

3.3. Data Sources and Method of Data Collection

The sources of primary data were sample households, key informants, and focus group discussants. Data from sample household was collected through structured questionnaire. It has focused on demographic, socioeconomic, institutional, physical and finical factors related to households' livelihood strategies. Enumerators who have the capacity, knowledge, familiarity with the culture and language of the study area were used to collect data. Secondary data was

gathered from numerous sources like research journals and articles, internet sources and reports.

3.4. Methods of Data Analysis

3.4.1. Descriptive and Inferential Statistics

In this study one of the objectives requires descriptive analysis and others requires econometric model. Descriptive statistics such as mean, percentages and standard deviations are used to describe various aspects of sample respondents. Inferential statistics such as , chi-square for only two categorical variables and chi-square for categorical variables that contain more than two categories was used to see if there is significant mean and proportion differences between categories in terms of different explanatory variables.

3.4.2. Econometrics Model

When there are more than two alternatives among which the decision maker has to choose (i.e. unordered qualitative or polytomous variables), the appropriate econometric model would be either multinomial logit or multivariate probit regression models. Gillespie et al. (2004) argued that a multivariate probit model (MVP) is advantageous because of its accounts for simultaneous Correlation of the error terms and thus reduces bias. The dependent variable in this study, choice of livelihood strategy is a polytomous variable. Consequently, a MVP is applied in jointly estimating the probabilities of adoption of multiple livelihood strategies listed. The data was analyzed using STATA version 13 statistical software.

Specification of Multivariate Probit Model

Rural households make a number of decisions in their daily activities. When there are alternatives to choose from; economic theory tells that agents choose what maximizes their expected utility given the existing situation (Moti and Gardebroek, 2008).

To identify the factors that affect rural household decision to engage in various livelihood strategies the mentioned econometric model will be used. The assumption is that in a given period at the disposal of its asset endowment, a rational household choose among the mutually exclusive livelihood strategies an alternative that offer the maximum utility. Thus a rural household is subject to a binary decision of either adopting strategy, Y_i ($Y_i=1$) or not ($Y_i=0$).

$$Y_i = f(X_i) \dots\dots\dots (1)$$

Where X_i represents a set of factors expected to influence choice of livelihood strategies according to the literature reviewed under conceptual framework.

If the household maximizes its utility defined over income realizations, then the household's choice is simply an optimal allocation of its asset endowment to choose livelihood that maximizes its utility (Brown et al., 2006). Thus, the i^{th} household's decision can, therefore, be modeled as maximizing the expected utility by choosing the j^{th} livelihood strategy among J discrete livelihood strategies. Following Choo and Mokhtarian (2008) and Velandia et al. (2009), the MVP model for $n = 3$ are specified as follows:

$$\dots\dots\dots (2)$$

where Y_i^* refers to n unobserved binary dependent variables representing the latent utility of household j , x' is a vector of explanatory variables, β_i is a vector of unknown parameters to be estimated and ϵ_i is the random error term which is normally distributed with mean zero and a unitary variance. The probability of a household adopting a strategy is such that:

$$\dots\dots\dots (3)$$

It may be re-written as:

$$y_i = \begin{cases} 1 & \text{if } x_i\beta_i + \epsilon_i > 0 \\ 0 & \text{otherwise, } i = 1, 2 \dots n \end{cases}$$

In this case, $\mathbf{n}$ has a variance-covariance matrix of the error terms, $\mathbf{M}$ with a standard normal density $\phi(\varepsilon_1, \varepsilon_2, \dots, \varepsilon_n; \mathbf{M})$.

$$\mathbf{M} = \begin{pmatrix} 1 & p_{12} & \dots & p_{1n} \\ p_{12} & 1 & \dots & p_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ p_{n1} & p_{n2} & \dots & 1 \end{pmatrix}$$

Thus, the joint probability that a household chooses a particular livelihood strategy such that $Y_i = y_i$, conditioned on parameters β_i , $\mathbf{M}$, and; can be derived from n variate standard normal distribution.

3.5. Definition of Variables and Research Hypothesis

Dependent Variables

Dependent variable for the multivariate probit model that was used in this study is smallholder farmers' livelihood strategy choices. The livelihood strategies identified by previous authors were agriculture (Ag); agriculture and off farm (Ag + OF); agriculture and non-farm (Ag + NF); and simultaneous use of agriculture, non-farm, and off-farm (Ag + NF + OF) (Adugna, 2008, Fekadu and Gebrehiwot, 2012 and Tatek, 2012). Another author, (Berhanu, 2007) was differently added agriculture and migration (Ag + Mg) livelihood strategies. For the purpose of this research a focus group discussion with male and female groups in sample selected Kebeles of Tribireti and Buta Dankore is conducted to identify the major livelihood strategies adopted by smallholder farmers in Boset woreda. A key informant interview with woreda agriculture office experts and Kebele development agents is also made to verify and refine the major livelihood strategies adopted by smallholder farmers in Boset woreda. Based on the results of the focus group discussions and key informant interviews, Agriculture in crop production, Agriculture in livestock rearing and non-agricultural activities composed of off farm and non-farm are identified as the major livelihood strategies among smallholder farmers in the woreda. Hence crop production (CP), livestock rearing (LR) and Non-Agricultural composed

of off farm and non-farm activities (NAg) were adopted as the major livelihood strategies pursued by smallholder farmers in Boset woreda. Non- Agricultural strategies in this specific study mainly refer to agricultural wage labor and horse cart transportation and seasonal sand excavation and small scale retail business. Petty trading is also one of the activities practiced by different household under a non-farm employment in the study area.

Independent Variables

The independent variables of the study are those variables which are hypothesized to have associations with smallholder farmers' decision to participate on different livelihood activities. Therefore, based on literature and data availability 14 potential asset-based explanatory variables were hypothesized as factors determining farmers' decision to participate in different livelihood strategies are explained as follows.

Sex of Household Head (SEXOHHH): it is dummy variable that takes the value 0 for female and 1 otherwise. Men and women have different access to resources and opportunities. Female-headed households are subject to discrimination in labor, credit, less access to improved technologies, land possessions, extension service and a variety of markets opportunities, they own less property as compared to men headed household. Gender affects diversification options, including the choice of income-generating activities (both farm and non-farm) due to culturally defined roles, social mobility limitations and differential ownership of/access to assets (Galab et al, 2002). They also carry a greater burden of rural poverty because of their vulnerable socio-economic position. Therefore, it was hypothesized that being female household head is negatively related with households' decision to participate in non-agriculture livelihood strategies in addition to crop farming or livestock rearing activities.

Age of Household Head (AGEOHHH): age can be defined as number of years of respondent at the time of data collection. It plays important role in poverty alleviating process. The study conducted by Adugna (2008) has shown that age has a significant negative effect on livelihood diversification. Thus, older farmers are expected to be less active and hence rely more on farm than off/non-farm income and younger household head are more likely to diversify their livelihood strategies than the older farmer because of older ones may have better access and

possession of resources accumulation (land and livestock). Therefore, age of HHH to be a negatively correlated with household decision to participate in non-agriculture livelihood strategy that give chance to diversify household income as they get older.

Educational Level of Household Head (EDULOHHH): is a continues variable and refers to the number of years of formal schooling the household head attended. The education level of households head in particular and the education levels of households' members in general affect households' livelihood in various ways (Tesfaye, 2003; Adunga, 2008 and Tatek, 2012). It assumed that formal schooling is expected to enhance farmer's ability to perceive, interpret and respond to new events. The farmers with higher schooling year are in a better position to know about effective and diversified livelihood strategies and can increase their adoption rate to new information and technology. This variable is therefore, hypothesized to affect farmer's participation in non-agriculture livelihood strategies positively.

Family Size (FAMSOHH): it is a continuous variable that refers to the total number of persons living within a household measured in adult equivalent. The family members are important in the implementation of a range of activities, such as; agricultural activities, off farm activities and nonfarm activities (Adunga, 2008; Daniel, 2009 and Aklilu, 2010). Family size contributes to the variation in HHH decision making on livelihood strategies. Larger family size may have labor force to engage in agriculture as well as other income source. This means the larger the family size the higher the likelihood to participate in varied livelihood strategies or income sources to cover household food consumption. Thus, this variable was expected to have a positive relationship with farmer's choice to participate in non-agriculture livelihood strategies and or adopt intensification in crop farming or livestock rearing livelihood strategy taking advantage of available labor.

Dependency Ratio (DEPRATIO): this is the ratio of children under age 15 and old age of above 65 to working age person in the family. It is a continuous variable measured in percent. The existence of large number of children under age of 15 and old age of 65 and above in the family could affect the poverty status of the household. A household with more economically inactive labor force compare to the active age shows a high dependency ratio and vice versa (Adunga, 2008). Children may necessitate greater income to support their basic needs attention

to attend elders also needs greater labour than contributing directly to productive role. A household with high dependency ratio is more likely indicative of labor scarcity which may encourage alteration of livelihood strategies. Therefore, dependency ratio was hypothesized to negatively affect household decision to participate in non-agriculture livelihood strategies.

Land Size (LANDSIZE): this variable is a continuous variable and it refers to the total arable land that a household owns in hectare. This variable is a basic asset for majority of the rural household. Owning larger area of land can be a means of accumulating wealth and source of animal feed. More land size holding means more cultivation and more possibility of production which in turn increases farm income and improves food security (Tesfaye, 2003, as cited in Tatek, 2012). Access to more arable land increases the opportunity to participate in agriculture livelihood activities. It is therefore, hypothesized that land size to have a negative influence on decision of HH to participation in non-agriculture livelihood strategies.

Distance from Nearest Marketing Center (DISTFNMAR): it is a continuous variable designating HHs proximity to the nearest market center measured in total hours taken to travel to the nearest market. Proximity to the marketing centers reduces the cost of time and labor that the farmer spent in walking. Access to market may create opportunities of more income by providing non-farm/ off farm employment opportunity and access to input and transportation (Fitsum and Holden, 2003). The other advantage is the more a farmer is near to marketing centers, they will have more knowledge about the market condition that helps to increase their bargaining power. Therefore; this variable was expected to have negative relation with household participation in non-agriculture livelihood strategies.

Access to Credit (CREACCE): it is dummy variable and takes the value 1, if they have access to formal credit both cash and input and 0, otherwise. Access to credit is one of the important institutional factors affecting choices of livelihood. It is a key determinant of self-employment whether in farm, off farm or the non-farm sectors. Moreover, diversification out of the agricultural sector is positively influenced through participation in formal credit markets (Escobal, 2001). In this study, it was hypothesized to have a positive effect with household

decision to participate in non-agriculture livelihood strategies and or adopt intensification in crop farming or livestock rearing livelihood strategies.

Contact with Extension Agent (EXTAGCON): is a continues variable, measured by the frequency of household head contact with extension agent for the past one year. Agricultural extension service provided by Ministry of Agriculture is the major source of information in agriculture and natural resource conservation. The additional advantage is, it increase sustainable use of natural resource and implementation of high return household strategies. Moreover, the stronger the linkage between farmers and development agents, the better the information flow and the technological (knowledge) transfer and helps to adopt valuable extension advises and improve productivity of agriculture (Adugna, 2008). Therefore, it is expected to have a positive relationship with farmer's participation in Crop farming and livestock rearing livelihood intensification to reduce income poverty at household level.

Membership to Cooperative (MMTCOOP): it represents whether a household is a member to cooperatives, or not. It is a dummy variable of which the value is 1 if the household head is member and 0, otherwise. A membership to cooperatives increases household's access to services that might be granted by being member. In Ethiopia, cooperatives are promoted by bureau of cooperative commission. For both off farm and non-farm diversification strategies, it would appear social networks that facilitate the sharing of farm equipment and labors as well as membership in community groups are important assets for the poor, access to services (Galab et. al., 2002). It is therefore hypothesized that this variable to have a positive relationship with farmer's choice decision to participate in Crop farming and livestock rearing livelihood strategies.

Input Use (INPUTUSE): it is dummy variable and takes the value 1, if they are users of improved technological inputs and 0, otherwise. This refers to agricultural input used by sample households such as fertilizer, high yielding varieties (HYVs), high yielding livestock breeds, and water pump. Improvement of productivity through use of improved farm input use by the household might enhance nonfarm activities. Input usage therefore, hypothesized to correlate positively with farmer's participation in agricultural livelihood strategies.

Receiving Remittances (RECREMT): it is a dummy variable which takes the value 1 for those who receive remittance and 0 otherwise. Receiving remittance refers to relative economic support in the form of money (cash) or in kind to the household from abroad and within the country, mainly from urban to rural dwellers. Remittances are playing an increasingly large role in the economies of many countries, contributing to economic growth and to the livelihoods of needy people (Ellis, 2000). It was expected that having relative economic support from abroad and within the country is positively related to the improvement of livelihood activities by participating in more remunerable activities such as local trading for which financial capital is required. Thus, this variable was expected positively affect household decision to participate in non-agriculture livelihood strategies.

Table 2: Summary, definition of explanatory variables

Dependent variable	Dependent variable
Y _i = CP	Crop Production
= LR	Livestock Rearing
= NAG	Non Agriculture (off-farm and Non-farm)
Code	Definition of explanatory variable
SEXOHHH	Sex of Household Head (0= Female, 1= Male)
AGEOHHH	Age of the household head in years
EDULOHHH	Education level of Household Head in years
FAMSOHH	Family Size of the household in number
DEPRATIO	Dependency ratio of the household
LANDSIZE	Land size owned by the Household in Hectares
DISTFNMAR	Distance of the nearest market from dwelling in hours
CREDACC	Credit accessed by the household (0= No, 1= Yes)

EXTAGCON	Extension agent contact with HH in the past one month (0= No, 1= Yes)
MMTCOOP	Participation of the household in cooperatives (0=No, 1= Yes)
INPUTUSE	Farm input use by the Household (0= No, 1= Yes)
INCDIME	Household income dimensions

4. RESULTS AND DISCUSSION

This chapter presents and discusses the results of descriptive statistics, inferential statistics and multinomial regression output for the determinants of choices of livelihood strategies. Section 4.1 deals with analysis of descriptive and inferential statistics and 4.2 presents the results of the econometric analysis.

4.1. Results from Descriptive Statistical Analysis

The statistical summary result from descriptive statistics is presented in table 3 and description of independent variables is provided under five major components of livelihood capitals households make use of in pursuing their choice of livelihood strategies.

4.1.1. Socio-Demographic Profile of Sample Households

This study involved 86 percent male and 44 percent female respondents. Of the total respondents, 84 percent did not attend formal education. This shows that the study area has a lower rate of educational attainment. From the total surveyed households only, 16% of respondents responded as having attended formal education. Concerning the age category of respondents, majority of them belong to the productive age group, between 24 and 65 years. The average age of respondents was 39. Table 3 indicates that 43% of the surveyed households are in the age range of 24-35 which shows significant presence of younger generation of small holder farmers. The study area has a relatively a higher level of household family size measured in adult equivalent in which 58% percent of the sample households had a household size of 3 to 5 in adult equivalent.

Table 3: Sex, educational level, age of Household Heads

Variables		Frequency	Percent
SEX of HHH	Female	28	14
	Male	172	86
AGE of HHH	24-35	86	43
	36-65	110	55
	>65	4	2
Family size in Adult Equivalent	2.0-3.0	63	32
	3.1- 5	116	58
	> 5	21	11

Education Level of HHH	0 (no formal education)	167	84
	Grade 1-8	33	17

Source: Own Survey, 2016

4.1.2. Choices of Livelihood Strategies

Households in the study area were found to pursue all the three livelihood strategies adopted for this study as the survey result showed. Given households various characteristics related to demographics and ownership and access to basic livelihood capitals, choices of livelihood strategies differ among surveyed households. Out of the total 200 surveyed households, 62% responded they pursue agriculture in crop farming livelihood strategies, while 57% and 38% of the surveyed households found to follow agriculture in livestock rearing and non-agriculture in non and off farm livelihood strategies.

Information on the choice of livelihood strategies by households presented in table 3 shows that households do pursue more than one livelihood strategy as the distribution and percentage of choices for each livelihood strategy is intermixed across the three choices.

The information in table 4 further shows the two choices in agriculture livelihood strategies are the dominant choices of the surveyed households constituting nearly 60% of the household's choices together. It is also clear in table 4 that crop farming and livestock rearing are complementary livelihood choices scoring very close percentages in the choices of households in the study area.

Table 4: Household's choices of Livelihood Strategies

		Crop Farming		Livestock Rearing		Non-Agriculture	
		N	%	n	%	n	%
Response	NO	76	38	86	43	114	61
	YES	124	62	114	57	86	38
	Total	200	100	200	100	200	100

Source, Own Survey 2016

The share of non-agriculture livelihood strategy in the area has shown a higher percentage given the study area is known to primarily depend on crop farming and livestock rearing livelihood strategies.

Table 5: Summary Statistics of factors influencing choice of livelihood strategies (Continues variables)

Variable	Mean	Std. Err.	Crop Farming	Livestock Rearing	Non-Agriculture
			t	t	t
AGEOHHH	38.75	0.60	-13.31*	-8.85*	12.10*
EDULOHHH	1.09	0.14	11.63*	8.14*	-9.74*
FAMSOHH	3.68	1.09	-3.64*	-1.52	2.99**
DEPRATIO	1.19	0.48	5.12*	2.90**	-5.41*
LANDSIZE	1.09	0.62	-12.97*	-8.80*	12.77*
DISTFMR	0.86	0.09	-0.83	-1.07	1.28

***, **, * significant at 1, 5 and 10% probability level respectively

Source: Own survey, 2016.

Table 6: Summary Statistics of factors influencing choice of livelihood strategies (discrete variables)

Variable		Crop Farming			Livestock Rearing			Non-Agriculture		
		N	YE		N	YE		N	YE	
		O	S	Chi	O	S	Chi	O	S	Chi
SEXOHH	NO	8	20	1.22	10	18	0.52	18	10	0.52

H	YES	68	104		74	98		98	74	
	NO	65	63		64	64		65	63	
CREACC	YES	11	61	24.65*	20	52	9.34*	11	61	23.49*
EXTAGC	NO	69	65		73	61	25.95	55	79	
ON	YES	7	59	31.37*	11	55	*	61	5	47.92*
								10		
	NO	73	112		82	103	5.47*	4	81	3.22**
MMTCOP	YES	3	12	2.23	2	13	*	12	3	*
INPUTUS	NO	73	93		80	86	15.37	87	79	
E	YES	3	31	14.80*	4	30	*	29	5	12.52*

***, **, * significant at 1, 5 and 10% probability level respectively

Source: Own survey, 2016.

4.1.3. Households Demographics and Choice of Livelihood Strategy.

Sex and Age of household heads are major demographic factors that influence choice of livelihood strategies.

Age of household head among rural smallholder farmers is related to either experience that leads to specialization in one livelihood strategy or activeness to engage in more than one livelihood strategy to diversify household income. The study hypothesized that older HHH are expected to be less active and hence rely more on crop or livestock livelihood strategy than pursuing additional non-agricultural livelihood strategy compared to their younger household counter parts that are more likely to pursue a diversified livelihood strategy. In the survey, the age of sample HH head ranged from 24-72 years and the mean age across the three livelihood strategy choices was 38.75. The statistical analysis revealed that the mean age difference among household heads that pursue and don't peruse all the three livelihood strategies has significance difference at 1% probability level.

4.1.4. Household Human Capital and Choices of Livelihood Strategies

Human capital resources available to households significantly affect households choice of livelihood strategy and under this section, education level of household head, family size and dependency ratio are discussed as factors affecting livelihood choices of households.

Education level among sampled household heads is observed to be among the factors that affect smallholder farmer's choice of livelihood strategy. Large percentages of the surveyed sample households are found to have zero grades of formal education which is more than 76%. The result for the mean difference in education level among household heads choice for all the three livelihood strategies is found to be insignificant among households that chose and didn't chose to pursue the two livelihood strategies. The mean education level of households that chose to follow and didn't chose to follow all the three livelihood strategies vary significantly at ($p < 1\%$).

Family size of households is perceived to influence household's decision to follow a particular livelihood strategy by contributing labor input that is critical in rural livelihoods. In the survey, the mean family size for all the three livelihood strategies was 3.68 in adult equivalent (Table 5). The smallest and largest value of family size for the surveyed households was found to be 2.3 and 6.15 respectively. The survey result showed that there is significance difference in mean family size among households that chose and didn't chose to follow Crop farming and non-agriculture livelihood strategies at less than 1% probability level.

Dependency ration was perceived to affect the choice of livelihood strategy of households by limiting the household's capacity to create more wealth by draining on the production produced by active labor in the household. Dependency ratio is defined as household members older than 65 and younger than 15 divided by the active labor force (15 to 65) in sampled households (World Bank, 2012). In light of this theory, a household with high dependency ratio has limited labor capacity to engage in more than one livelihood strategy to create and accumulate wealth for the household's sustainable livelihood outcome. The survey result showed that mean dependency ratio across the three livelihood strategies is 1.19 (Table 5). The lowest and highest dependency ratio for the sampled households was 0 and 2.2 respectively. The statistical analysis also showed that there is a significant difference with respect to household dependency ratio and their choice of specific livelihood strategy for all the three livelihood strategies.

4.1.5. Households Ownership of Natural and Economic Capital and Choice of Livelihood Strategy

Land and livestock holding size of sampled households is used as natural capital factors for the choice of livelihood strategy in the study.

Land followed by livestock is the critical asset that small-holder farmers have in rural households. Land holding size for the surveyed households ranged from the smallest 0.25 acres to the largest 4 acres. The mean land size for sampled household was found to be 1.05 acres and large difference in the mean value of land holding sizes for the three the livelihood strategies were observed (Table 5). Across the three livelihood strategies, it was observed that households that chose to pursue crop farming and livestock rearing livelihood strategies have larger mean land holding size compared to households that chose to pursue non-agricultural livelihood strategies. The result of statistical analysis also showed that there is statistically significant difference between farm land size and households choice of the three livelihood strategies at 1% probability level.

4.1.6. Households Access to Financial and Physical Capital Choice of Livelihood Strategy

Access to market, credit services and improved agricultural inputs are used as financial and physical capital factors of choice of livelihood strategy by small holder farmers in the study.

Access to credit is hypothesized in the study to contribute to positive livelihood outcome by providing rural households access to financial capital that helps them to diversify and or intensify the livelihood strategy they chose to pursue. Among the surveyed households the level of access to credit is very low with only 36% of the sampled households reporting that they have received credit in the past three years. The statistical analysis showed that, there is significant difference between households' choice of a specific livelihood strategy and access to credit for households that chose and didn't choose to pursue all the three livelihood strategies at ($P < 1\%$).

Input use is categorized under the physical capital rural small holder farmers employ to intensify their choice of livelihood strategy, particularly in crop farming and livestock rearing. The mean value of input use between households that chose and didn't choose to pursue a specific livelihood strategy has shown a statistically significant difference at 1% probability level across all three livelihood choices.

4.1.7. Households Access to Social Capital and choices of Livelihood Strategy

Under social capital factors of livelihood strategy, households access to extension services and membership to cooperatives is used in the study.

Agricultural extension service is used by the government of Ethiopia to provide information and skill on improved agricultural activities to rural smallholder farmers. Extension contact delivers services like advice, training, demonstration and distribution of input to rural households. In this study, it is hypothesized that farmer's contact with extension agent will lead to intensification and or diversification of livelihood strategies by small holder farmers.

The chi square statistical analysis showed that, there is significant difference in the mean value of households extension agent contact among households that chose and didn't choose to follow all the three livelihood strategies at 1% probability level.

Membership to cooperatives as hypothesized was found to significantly vary across household's at (<0.05) and (<0.1) for choice of livestock and nonagricultural livelihood strategies. This might be because households mostly access inputs and credits through cooperative societies. The result is in line with that of Warren (2002) and Bezemer and Lerman (2002).

4.2. Econometric Result

In this sub section the results of the multivariate probit model of factors affecting livelihood strategy choices of small holder farmers are presented.

4.2.1. Determinants of Choice of Livelihood Strategies among Smallholder Farmers

Under this section household capital assets (human, natural, social, physical, and financial) which were hypothesized to influence the farmers' choice of different livelihood strategies are presented. STATA version 13 is used in the analysis of the multivariate probit model.

Table 7: Multivariate probit estimation results for households' choice of livelihood strategies

VARIABLE	Crop Farming			Livestock Rearing			Non-Agriculture		
	Coef.	z	P> z	Coef.	z	P> z	Coef.	z	P> z
SEXOHHH	-0.665	-1.290	0.198	0.035	0.110	0.909	0.21	0.55	0.58
AGEOHHH	0.192	3.100	0.002*	0.80	2.71	0.00*	-0.08	-2.22	0.03**
EDULOHHH	-0.391	-1.78	0.07***	-0.15	-2.25	0.03**	0.26	2.07	0.03**
FAMSOHH	0.241	1.140	0.255	-0.18	-1.49	0.14	0.12	0.76	0.44
DEPRATIO	0.349	0.970	0.330	0.28	0.22	0.20	0.24	0.90	0.37
LANDSIZE	1.810	2.340	0.019**	0.41	1.88	0.06***	-0.81	-2.59	0.01*
DISTFNMAR	0.830	0.230	0.818	0.02	0.08	0.93	-0.15	-0.57	0.57
CREACC	0.807	1.710	0.087***	-0.32	-1.20	0.22	-0.10	-0.30	0.76
EXTAGCON	0.133	0.290	0.775	0.47	0.97	0.07***	-1.40	-3.60	0.00*
MMTCOOP	-0.30	-0.43	0.67	0.47	0.97	0.33	-0.35	-0.53	0.59
INPUTUSE	0.32	0.43	0.67	0.75	1.98	0.05**	0.03	0.07	0.94
_cons	-8.90	-3.25	0.00	-2.98	-2.33	0.02	5.39	4.27	0.00

***, **, * significant at 1, 5 and 10% probability level respectively

Source, own survey 2016

Table 8: Relationship between choices of livelihood strategies

	Crop Farming	Livestock rearing	Non -Agriculture
Crop Farming	1		
Livestock Rearing	0.38***	1	
Non- Agriculture	-0.54***	-0.51***	1

*** Significant at 1% probability level.

Source, own computation 2016

Table 9: Partial Predicted Probabilities for choice of Livelihood strategies

Variable	Obs.	Mean	Std. Dev.	Min	Max
Crop Farming	200	.6189162	.428357	1.66e-11	1
Livestock Rearing	200	.5776356	.330878	.0092739	1
Non-Agriculture	200	.4314036	.4014581	4.22e-11	.9986796

Source, own computation 2017

Table 10: Joint Probabilities of choice of Livelihood Strategies

Variable	Obs	Mean	Std. Dev.	Min	Max
LiveStr. jpr1s	200	.0380568	.06053166	1.93e-12	.4166376
LiveStr. jpr0s	200	.0155133	.03463249	3.64e-30	.2733246

Source, own computation 2017

4.2.2. Interpretation of Econometric Results

Age of Household Head (AGEOHH): The age of household head is was found significant ($p < 0.5$) to positively influence small farmers decision to pursue crop farming and livestock rearing livelihood strategies as they age and negatively influence small holder farmers decision to pursue non-agriculture livelihood strategies as they age. This implies that farmers who are younger more likely to pursue non-agriculture livelihood strategies than crop farming or

livestock rearing livelihood strategies alone. The reason for this could be the fact that young farmers have limited access to land compared to their aged farmer counterparts to support their livelihood with Crop farming and livestock rearing livelihood strategies. This result is in agreement with previous studies by Barrett *et al.*, (2001); Destaw, (2003), Rao *et al.*, (2004); Adugna, (2005); Mulat *et al.*, (2006), Berhanu (2007), and Khan (2007).

Education of the household (EDULOHHH): Education increases farmers' ability to get involved in high reward livelihood activities. Households with the average high level of education leads relatively better life by diversifying their income enhancing livelihood activities such as working on off-farm and non-farm (often in better remunerated occupations) than the other (Fekadu and Gebrehiwot,2012).

Education level of households was found to negatively correlate with the decision of household's participation in crop farming and livestock rearing livelihood strategies at less than of 5 and 10 percent probability levels respectively. In the same way Education level of household head was found to positively influence households' decision of non-agriculture livelihood strategy at less than 5% probability level. This indicates that, the higher level of education of the household, the lesser would be the decision to pursue crop farming and livestock rearing livelihood strategies and the opposite is to for the decision to pursue a non-agriculture livelihood strategy. The result is in agreement with the findings of Tatek (2012).

Land Size Owned (LANDSIZE):- land holding size of household is observed to have a significant positive correlation with the likelihood of household's choice of crop farming livelihood strategy at 1 percent probability level. This indicates that rural households with larger land holding size are more likely engage in extended crop farming activity instead of diversifying to non-agriculture livelihood strategies. On the other, the likelihood of households to pursue non-agriculture livelihood strategy and their land holding size is negatively correlated at 1% probability level, indicating increased likelihood of engagement of households with lower land holding size in non-agriculture livelihood strategies compared to those with large land

holding size households. The findings of Berhanu (2007), Mulat *et al.*, (2006) and Khan (2007) also supports the result of the econometric model.

Credit Access (CREACCE): Access to credit services allows farmers to follow agricultural intensification by accessing farm inputs which in turn improves productivity (Adunga, 2008). The formal and informal credit facilities available for rural farmers are very important resources in rural livelihoods not only to finance agricultural inputs activities, but also to protect loss of crucial livelihood assets such as cattle due to seasonal food shortage, illness or death (Tesfaye, 2003).

Access to credit is found to have a significant ($p < 0.05$) positive impact on the likelihood of households choice of crop farming livelihood strategy. This is mainly due to the fact that most households use credit services to buy agricultural inputs such as fertilizer and improved seeds. The result is in line with Berhanu (2007), Adunga (2008) and Tatek (2012).

Extension Agent Contact (EXTAGCON): Use of extension agent service was found to positively and significantly ($p < 0.1$) affect households choice of livestock rearing livelihood strategy. The objectives of extension is to change farmers outlook towards their difficulties which assists them adapt better solution to their livelihoods (Samuel, 2001). Thus, the information obtained and the knowledge and skill gained from extension organization may influence farmers' skill and decision making on intensifying agricultural livelihood strategies. In other way, use of extension agent service is found to negatively and significantly ($P < 0.01$) affecting households choice of non-agricultural livelihood strategy. This could be due to the fact that rural extension services mostly concentrate in the agricultural livelihood strategies and households with no or limited access to agricultural livelihood capitals tend to have a lesser likelihood of using the service.

Inputs Use (INPUT): Use of inputs was found to be positively and significantly correlated ($P > 5\%$) to households choice of livestock rearing livelihood strategy indicating, a higher likelihood of household to have access to improved inputs to pursue livestock rearing livelihood

strategy to intensify their activity through use of processed cattle feed and livestock production services such as artificial insemination.

4.2.3. Relationship between Choices of Livelihood Strategies

The multivariate probit model is estimated using the maximum likelihood method on individual response outcome of choice of livelihood strategy. The MVP model fits the data reasonably well [Wald chi2 (33) =128.4, $P= 0.000$].

The multivariate probit regression result showed that there is correlation between choices of livelihood strategies leading to rejection of the hypothesis that all regression coefficients in each equation are jointly equal. In the same way, the likelihood ratio test of the null hypothesis that the covariance of the error terms across equations are not correlated is also rejected [$\chi^2 (3) = 16.85$, $p = 0.0008$] confirming the presence of interdependency among choices of livelihood strategy. The correlation matrix result of the multivariate probit model showed that there is a positive and significant relationship (38%) between Crop farming and livestock rearing livelihood strategies while there is a negative and significant relationship between choice of non-agriculture livelihood strategy and crop farming and livestock rearing livelihood strategies (Table 5).

The positive sign indicates complementarity and the negative sign shows inverse relationship between livelihood strategies. Hence, the result indicates that there is complementarity between crop farming and livestock rearing livelihood strategy while there is inverse relationship between non-agriculture and agriculture in crop farming and livestock livelihood strategies.

The result regarding predicted probabilities for the choice of each livelihood strategy showed that Agriculture in crop farming is the major livelihood strategy in the study at 61% predicted probability followed by agriculture in livestock rearing at 57% (Table 6). Non-agriculture livelihood strategies have the least predicted probability at 43% in the study area. The result from predicted probabilities shows that households in the study area still pursue agriculture in crop farming and livestock rearing strategies while the share of non-agriculture livelihood strategies is also growing.

The joint probabilities result for adopting all three livelihood strategies and for not adopting all the three livelihood strategies showed a lower percentage of 4% and 1.5% respectively. This shows that most of the households in the area either pursue one dominant livelihood strategy or one dominant strategy complemented by another less dominant livelihood strategy. The joint probability of not adopting all the three livelihood strategies is also very unlikely showing households do pursue one viable livelihood strategy from among the available livelihood strategies.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

The study on Determinants of Livelihood Strategy among small holder farmers was conducted in Oromia Region, East Shoa Zone of Boset Woreda with specific objectives of assessing livelihood strategies pursued by smallholder farmer and determining factor affecting the choice of household livelihood strategies. Multivariate probit model with maximum likelihood simulation model was used to analyze cross sectional data collected from a total of 200 respondents in late 2016.

The descriptive analysis result of the study indicated that the mean age of the sampled households was 38.75 with 1.09 grades average level of education. Result from descriptive analysis further showed the existence of significant mean difference among different sample category in sex of the household head, landholding size, and access to credit, and distance to market center and receiving remittance at different probability level.

As the dominant livelihood strategy pursued by large percentage of households in the study area, crop farming was found to negatively influenced education level household at 1% probability level. Age of household head, land holding size, credit access and extension agent contact were found to positively influence household's choice of crop farming and livestock rearing livelihood strategy at 1 percent probability levels.

The study also found that households who are at lower level age, have formal years of education and with limited access to natural capitals such as land and livestock to more likely pursue non-agriculture livelihood strategy. The result of the multivariate probit model

regression revealed that out of 12 independent variables included in the model, 6 explanatory variables were found to significantly determine the choice of livelihood strategies among rural small holder farmers at less than 1%, 5% and 10% probability level.

5.2. Conclusion

Based on the findings of the study, choice of livelihood strategies among small holder farmers is evolving rapidly following decline in access to natural capital mainly land and livestock. Recurring droughts and shrinking of farm and grazing lands are affecting the livelihood strategies of rural households in the face of a less developed and organized market system that can offer non-agriculture livelihoods.

The study has shown that young household heads that constitute more than 35% of small holder farmers in the study area are the most vulnerable with limited access to critical capital in rural livelihoods. This same group of the small holder farmers also found to better pursue non-agriculture livelihood strategy owing to their active age, better schooling years and vulnerability to food insecurity due to limited natural and physical capital.

The study also found that agriculture intensification in the study area tend to be weak as large percentage of surveyed households reported not to have regular extension agent contact and lower use of improved agricultural inputs. This is mainly related to the pessimist attitude that has resulted from repeated crop failures due to drought and bad climatic condition such as flooding that affects the study area most of the time.

Use of credit services and participation in cooperatives groups is also found to be at lower level among households surveyed for this study. The major reason behind the lower rate of credit use and participation in cooperatives group is lack of information, high interest rates, lower business skills and fear of credit not to lose basic collaterals in case of inability to repay.

Rural household's small holder farmers pursue a specific livelihood strategy based on their access to specific livelihood assets available to them. The final conclusion of the study is that, rural households in the study area still pursuing crop farming and livestock rearing livelihood

strategies as dominant livelihood strategies with declining livelihood supporting capitals such as land holding in light of increasing vulnerability due to adverse climatic conditions. The younger generations of smallholder farmers are characterized with their vulnerable condition on one hand due to declining access to basic livelihood capitals and increased participation in non-agriculture livelihood strategy to offset limited chance of participation in traditional agriculture in crop production and livestock rearing livelihood strategies.

5.3. Recommendation

Based on the findings of the study, the following recommendations are made for consideration in current and nearby future in order in efforts made to intervene through livelihood policy and program interventions in the study area by concerned stakeholders.

The study found out that household choices of Livelihood strategies and age of households is positively correlated for crop farming and livestock rearing livelihood strategies showing an increase in age of small holder farmer would likely lead them to stay in crop intensification activities. On the other hand, age of household heads had a negative relationship with household's choice of non-agriculture livelihood strategies indicating younger household heads are more likely to engage in non-agriculture livelihood strategies. Rural livelihood policy planning and implementation would be effective if the difference in age of households heads is taken into account in targeting older and younger smallholder farmers in livelihood programs.

Increase in educational attainment is observed to positively influence households' choice of non-agriculture livelihood strategies compared to non-educated households. Promoting access to formal and informal education which is found to be at a very lower level should be the focus area of government and all concerned stakeholder in order to increase the likelihood of household's involvement in non-agriculture livelihood strategies Attempt in providing basic social services such as education is important in increasing the capabilities of human capital and vital in strengthen the change processes to be undertaken towards the lives of rural poor. Hence, focused government policies need to be designed to increase formal and informal education to increase rural household participation in diversified and viable livelihood options.

Credit access to households that pursue agriculture in crop production is found to positively influence household choice of crop farming livelihood strategies indicating households will use credit to intensify crop farming through fertilizer and improved seed use and purchase of oxen. Enhancing rural credits service to subsistence farmers in the study area need to be considered as one areas of intervention. Rural credit service can help farmers in solving capital problem in buying farm oxen and farm inputs such as fertilizer and improved seeds. .

Distance from market is found to be positively influence household choice of crop farming livelihood strategy indicating, farmers that are far from market center are most likely to pursue only crop farming livelihood strategy. Better access to local markets by small holder farmers would help in providing better chances of households to participate and act in both sides of the market by selling and buying their output, providing labor and negotiating a bargaining terms for better trade terms which will in turn improve their livelihood outcome. .

The poor are not only producers but also wage laborers and small business maker; extension service needs to go far beyond promoting technologies not simply focused to increased production alone. Extension service in the study area needs to promote livelihood opportunities from nonfarm and off farm activities in organized manner for smallholder farmers at grass root.

Business

Household livelihoods are highly dynamic. Policy-makers need to reflect on the most suitable ways of supporting this diversity because the narrow approach does not address the problem of poor people. Hence, the intervention in the area should focus in expanding the alternative livelihood activities through identifying the viable livelihood strategies based on a specific situation, particularly considering who is really poor and what resources are available.

Household livelihoods are highly dynamic. Policy-makers need to reflect on the most suitable ways of supporting this diversity because the narrow approach does not address the problem of poor people. Hence, the intervention in the area should focus in expanding the alternative livelihood activities through identifying the viable livelihood strategies based on a specific situation, particularly considering who is really poor and what resources are available.

Continuous assessment and monitoring by concerned stakeholders is important for appropriate and updated decision making regarding the livelihood of rural household. It is hence advised to makes a concerted effort in this area to bring about desired outcome of sustainability in rural livelihoods of the study area.

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7. APPENDIX

Appendix Table 1: Conversion Factor for tropical livestock unit (TLU)

List of Animals	TLU
Calf	0.25
Heifer	0.75
Cow and Ox	1.0
Horse	1.1
Donkey	0.7
Camel	1.25
Sheep and goat (adult)	0.13
Chicken	0.13

Source: Stock *et al.*; cited in Alemitu, 2011

Appendix Table 2: Conversion factor for adult equivalent ration

Age group (Years)	Male	Female
Less than 10	0.0	0.0
10-13	0.2	0.2
14-16	0.5	0.4
17-50	1.0	0.8
Above 50	0.7	0.5

Source: Strock et al.; cited in Alemitu, 2011.

Questionnaire for Interview of Sample Respondents

Choices of Livelihood Strategies among Small Holder Farmers in Boset Woreda Eastern Shoa Oromia Region

Serial number of the questionnaire

Interviewers name _____

Date of interview _____ signature _____

Entry: -

Good morning/ afternoon sir/madam? My name is _____. The objective of this interview is to collect data for academic. It has no any administrative values and/ or will not use for decisions that might affect your personal life. Thus, be confidential and open in your responses.

1) General Information

Name of the KA _____

Name of HH head _____

Sex of household head (1) Male (0) Female

Age of household head _____

Education level of household head (in years completed) _____

Do you read and write? 1 Yes 2 No

Household size _____

2) Household Demographic Characteristics

Name	Age	Number & sex of family members			Marital Status	Educational level	Main occupation
		M	F	Total			

Code

Sex	Religious	Education	Occupation	Marital status
0= Female	1=Orthodox	1= Illiterate	1= Crop Production	1=Married

1= Male	2=Protestant	2= Read and write	2= Livestock Rearing	2=Single
	3=Muslim	3= Grad 1-4	3= Non Agricultural (Petty trade, Handicrafts, horse cart business and agricultural labor)	3=Divorced
	4 =Catholic	4= Grad 5-8	4= Student	4= Widowed
		5= Grad 9-10	5= Daily Laborer	
		6= Grad 11-12		
		7= College /certificate		
		8= Other		

5) Livelihood assets

5.1. Natural capital

5.1.1. What kinds of natural capital do you have? (Multiple answers is possible)

1) Land 2) Forest/tree 3) water supply 4) Livestock 5) Other specify _____

If the respondent doesn't have land, ask Q.5.1.2

5.1.2. What is/are the source of your livelihood?

1) Crop Farming 2) Livestock Rearing 3) Nonagricultural Activities (petty trade, wage labor, handicrafts, horse cart business, Charcoal making/fire wood selling)

4) Support/remittance from Relatives/children

5) _____ Others _____ (please specify)

-----.

5.1.3. If the respondent choose option 1. For the Q. 5.1.1., please go to the next form

Land use and farm characteristics form

Plot No	Size(ha)	Ownership	Use	Crops grown

Codes for ownership style: - 1=Own 2= Rented 3=Shared 4= Cooperative Groups
Farming

- Codes for acquire of land: 1= Land distribution 2= Inheritance
3= Purchase 4= other (specify) _____
- Codes for slope: 1= Flat 2= Gentle 3= Steep slope
- Codes for land use: 1= cultivation 2= grazing 3= forest 4= degraded/ uncultivated

NB. Use local units in asking land size and convert to standard units

5.2. Human resource or capital

5.2.1 Does your household members have access to school? 1) Yes 2) No

5.2.2 If your response for Q. 5.2.1 is —yes, how far it is from your home? (In hours of travel)

- 1) Grade 1-4-----hrs. 2) Grade 5-8-----hrs. 3) Grade 9-10-----hrs.
4) Grade 11-12-----hrs. 5) Technical school -----hrs. 6) Non-formal centre-----hrs.

5.2.3. Do you have any of the following skills?

- 1) Modern agricultural skills obtained from training at FTC/extension program
2) Handcraftsmanship (Carpentry, metal work, pottery) 3) Indigenous knowledge
(Traditional medicine) 4) others (please specify) -----.

5.2.4. How far are you from FTC center (in hours of travel?) -----hrs.

5.2.5. Have you received any training /skill in the FTC center? 1) Yes 2) No

5.2.6. If your response is —yes for Q.5.2.5, what was the kind of training/skill?

5.2.7. Did you get any training in the past one year by a government or non-government body other than FTC 1) Yes 0) No

5.2.8. If yes for Q. 5.2.7, for how many days? -----Days.

5.2.9. If yes for Q. 5.2.7, from where did you get the training? 1) Governmental organization

2) Nongovernmental organization 3) others specify the name of organization _____

5.2.10. What kind of training did you get? _____

5.2.11. If you have received trainings/skills, do you think the trainings were helpful for your practical problems? 1) Yes 2) No

5.2.12. If your response is —No to Q.5.2.12, why? _____

5.3. Physical assets (Water supply, Irrigation facility, Health services, Road, Implement tool, Energy production, Transportation facilities, Marketing facilities)

5.3.1. Do you have your own house? 1) Yes 0) No

5.3.2. What types of house do the household own? (Give answer by interviewee observation)

1) Mud walls and grass Roof 2) Mud walls and galvanized iron (korkoro) roofed

3) Grass walls and grass roofed 4) Other (Specify) _____

5.3.3. How far is your residence from the following places in hours of travel made?

1) Farm plots _____ in hrs? 2) Input supply shop _____ in hrs?

3) Nearest market _____ in hrs? 3) Woreda town _____ in hrs?

4) Bus service/transport/main road (if accessible) _____ in hrs?

5.3.4. Where do you sell your farm products? (Multiple answer possible)

1) On farm (local assembler) 2) Taking to the local market 3) Through service

Cooperatives 4) others (specify) _____

5.3.5. What means of transportation do you use to transport your produce? 1) Trucks

2) Animal power 3) Human power 4) others (specify) _____

5.3.6. When do you sell most part of your produce? 1) In the first three months of harvest 2) three to six months of harvest 3) don't sell at all

5.3.7. What are some of the problems you face in marketing your products?

1) Transportation problem 2) Too far from market place 3) Low bargaining power 4) Low price of Agricultural produce 5) other specify _____

5.3.8. Do you get reasonable price for your produce at this particular time? 1) Yes 0) No

5.3.9. If no, what are the reasons? (Multiple answerers is possible) _____

1) No (demand) for the produce 2) More supply of the produce

3) Lack of access to potential market 4) others (specify) _____

5.3.10. Why do you sell at that particular time of lower (unreasonable) price? _____

1) To settle debts 2) To pay tax 3) Social obligations (wedding, funeral, Idir, etc)

4) To meet my family non-food needs (education, health, clothing etc) 5)
 others (specify) _____

5.3.11. What Energy sources do you have for use in your house and living 1) Electric power
 2) Gasoline fuel 3) Solar power 4) Fire Wood?

5.3.12. What Energy sources do you use to do your job for a living 1) Electric Power
 2) Diesel Power 3) Animal Power 4) Human Power/manual labor

5.3.13. Do you have access to irrigation facility? 1) Yes 2) No

5.3.14. If yes how much size of your land is cultivated using irrigation? _____ in hectare?

5.3.15. What about the types of ownership? 1) Your own 2) groups /cooperatives 3)
 Community 4) Others specify _____

5.3.16. Do you have access to telecommunications? 1) Yes 2) No

5.3.17. Do you have access to electricity service? 1) Yes 2) No

5.3.18. Do you have access to new agricultural technologies? 1) Yes 2) No

5.3.19. If your answer for Q.5.3.17 is —yes, could you mention them, please?

5.3.20. If your answer for Q.5.3.17 is —no, could you tell me the reasons?

- 1) There is no new technology at all 2) I don't have any information
- 4) The cost is high and I do not have money 3) I don't have sufficient land/farm resources
- 5) Others (please specify) _____

5.3.20. Do you have access to clean water? 1) Yes 2) No

5.3.21. What are the sources of water for your household? (More than one answer is possible)

- 1) Spring 2) Hand pump 3) Well 4) River 5) Pond
- 6) Other sources (please specify) _____.

5.3.22. How far are you from the following health care centers?

- 1) Health post _____ hrs. 2) Higher clinic _____ hrs.
- 3) Nearby hospital _____ hrs. 4) Traditional Doctors _____ hrs.

5.4. Economic and financial sources/ Credit use

5.4.1. Do you have a problem of working capital? 1=Yes 2 = No

5.4.2. Is there access to credit in your PA? 1. Yes 2. No 3. I don't know

5.4.3. Have you received any type of credit in the past three years? Yes = 1 No= 0

5.4.4. If yes for Q. 5.4.3. What is/are the types of credit?

- 1) Fertilizer credit 2) Improved seed credit 3) Livestock credit
 4) Post harvest technology credit 5) Land management credit 6) saving and credit
 7) Agricultural diversification credit 8) Income generating credit
 9) other (specify)

5.4.5. If yes to Q. 5.4.3, how?

- 1) With collateral 2) Without collateral 3) With written agreement 4) with 'wabi'
 5) other means (specify)

5.4.6. If yes for the Q 5.4.3 fill the following table

No	Source borrowed	Purpose borrowed	Amount borrowed	Interest amount paid	Amount Paid /returned Birr

5.4.7. Codes for purpose (s) 1) Purchase of seeds 2) Purchase of fertilizer

- 3) Purchase of oxen 4) Purchase of chemicals
 5) Purchase of farm implements 6) For consumption

7) For social obligation

5.4.8. Codes for the sources of credit?

- 1) Service cooperatives 2) Commercial banks 3) Development bank 4)
 Friends and relative 5) Micro finance institutes 6) Local moneylenders 7) NGOs 8)
 Idir/Mehaber 9) Others _____

5.4.7. If no why? (Multiple answers are possible)

- 1) Fear of ability to pay 2) Lack of asset for collateral 3) No one to give credit
 4) High interest rate 5) No need for credit 6) I don't know any credit institution

7) Others (specify) _____

5.4.8. What are your main sources of income (in order of importance)?

1) Crop sale 2) Livestock sale

3) Non Agricultural income (Off-farm income and Non-farm income)

5.4.9. If non-agricultural activities (non-farm activities) are used as sources of income,

indicate which one of the Following provides the most significant income?

1) Casual work 2) Retailing goods/petty trade 3) Part time paid work 4) Horse cart transportation business 5) Sand excavation and sale business 6) Remittances from urban areas 7) Renting urban house rooms

8) Others (specify) _____

5.4.10. If Non-agricultural activities (off-farm activities) are used as income sources, indicate which one you use most?

1) Working on other peoples farm for payment 2) Grain retailing

3) Retailing livestock 4) Selling fuel wood/charcoal/timber/grass/dung

5) Petty trade in the village 6) others (specify) _____

5.4.11. What is the estimated amount of total Non-agricultural activities (off-farm) income of the household in 2007/08 E.C? _____

5.4.12. What is the estimated amount of total Non- agricultural (non-farm) income of the household in 2007/08 E.C?

5.4.13. Total annual income 2003/2004 E.C? _____

5.5. Social capital

5.5.1. Are you a member of the following Institution/organization /social relations?

Institution/organization /social relations	Member	Benefit of members	Eligibility criteria	Role in the given Institution/organization /social relations			
				Leader	Committee member	Active participant/member	Inactive participant/member
Cooperatives							

Ekub							
Mahiber							

5.5.2. How are you benefiting from these institutions?

6. Crop production

6.1. What crop are you growing?

Major crop	Average output for 2007/2008 in quintal
Teff	
Maize	
Sorghum	
Haricot Bean	
Sugar Cane	
Other /specify/	

6. 2. Can you tell me the trend of crop production during the last five years?

- 1) Productivity (yield) decreased 2) Change in type of crops grown
 3) Productivity (yield) increased 4) Crop diversification increased
 5) There is no change 6) other (please specify) -----.

6.3. was what you have produced last year enough for your family? 1= Yes 0=No

6.4. If no, for how long did it last? _____ Months.

6.5. During which months is food shortage severe? _____ Month (s)

6.6. How did your household cover the food shortage?

- 1) Purchase of grain from market 2) Food / cash for work

3) Support from relatives and friends 4) Cash credit to be replaced in kind from harvest

5) Grain credit to be replaced in kind from harvest 6) others specify_____

6.7. If relief food was the means to fill the deficit in food need, for how long have you been got food aid?

1) ____ Years 2) ____ months per year

6.8. If relief food was the means to fill the food need deficit, indicate the amount of food aid your household received last year? Wheat _____ kg/Qu _____litter oil

6.9. Do you think food aid is permanent and sustainable solution for your household food deficit? 1) Yes 2) No

6.10. If No, please specify your future plan to face the deficit? _____

6.11. What do you think are the main causes of food deficit in order of importance?

- | | |
|---|---|
| 1) Absence of adequate rainfall | 2) Insect or pest infestation |
| 3) Shortage of cultivated land | 4) Poor quality of land 5) Animal disease |
| 6) Poor health situation of the farmers | 7) Flood 8) Shortage of oxen |
| 9) Shortage of input supply | 10) Transport and marketing challenges |

6.12. What crises has the household faced in the past one year?

- 1) Health crises 2) Natural disasters 3) Crop failures 4) Civil unrest
5) Legal problems 6) other specify_____

6.13. How did the household mitigate the crises? _____

7) Livestock Ownership

7.1. Do you have livestock? 1) Yes 2) No.

7.2. If the answer for Q.7.2. is yes, fill the table below!

Type	No. owned	Value in ETB	Use	Means of acquisition
Chickens				
Goats				
Sheep				
Donkeys				
Mule				

Horse				
Cow				
Ox				
Camel				
Others				

Code for use of livestock:

1= Meat 2= Manure

3= Milk 4= eggs

5= saving 6= Animal traction

Code for acquisition

1=bought 2= gift, 3=sharing

4=Inherited 5=others /specify/

7.3. What is/ are the main feed source(s) in your area?

1) Private grazing land 2) Communal grazing land 3) Haymaking

4) Other (specify) -----

7.4. What is the trend of grazing land since the last five years?

1) Increased 2) Decreased 3) Remain the same

7.5. If the answer for Q.7.5. is —decreased, what are the major reasons? Can have multiple!

1) Expansion of farmland 2) Enclosure for afforestation

3) Expansion of settlement 4) Grazing land degradation

5) Land acquisition for investments 6) Urbanization 7) Others (please specify) -----

7.6. If the answer for Q.7.5. is —increased, what are the major reasons?

1) Contraction of farmland 2) Deforestation

3) Grazing land regeneration 4) Others (please specify) -----.

7.7. What is the trend of livestock population?

1) Increased 2) Decreased 3) Remain the same

7.8. Did you sale livestock in the past one year? 1) Yes 2) No

7.9. If the answer is yes, what was the reason for sale?

- | | |
|------------------------------------|---------------------------|
| 1) To purchase agricultural inputs | 2) To Purchase food |
| 3) To construct house | 4) To purchase clothes |
| 5) Social obligations | 6) To purchase farm oxen |
| 7) To pay taxes and other debts | 8) Others (Specify) _____ |

7.10. Did you face decline in livestock population in the past and in the present time also?

1. Yes 0. No

7.11. If yes to question number 7.10, what are the reasons for the decline in livestock population?

- 1) Draught 2) Disease 3) livestock sale 4) other _____

7.12. If you do not have enough oxen for farming how do you get additional oxen you need?

- | | | |
|------------------------|--------------------------------|------------------------|
| 1) Hire from someone | 2) Coupling with other farmers | 3) Borrow from friends |
| 4) Exchange with labor | 5) others (specify) _____ | |

8. Input use

8.1. Have you ever used improved farm implements in the last five years? 1) Yes 2) No

8.2. If your answer for Q.8.1 is —yes, what are they?

- 1) Water pump 2) Modern beehives 3) Thrashers 4) Modern hoe
5) Others-----.

8.3. If your answer for Q.8.1. is —No, why?

- 1) There is no new technology at all 2) I don't have any information
4) The cost is high and I do not have money 3) I don't have sufficient land/farm resources
5) Others (please specify) -----.

9. Livelihood strategies

9.1. What are your household's major livelihood strategies?

- 1) Crop farming 2) livestock rearing 3) Non-Agricultural activities
4) Other specify_____

9.2. Is there anybody who helped you to choose existing livelihood strategies? 1) Yes 2) No

9.3.14. If your answer is yes, can you tell me the name of those who help you in your choice of livelihood strategies?

- 1) My family 2) My wife 3) Development agent 4) NGOs
5) Other specify _____

9.4. For how long have you been implementing your existing livelihood strategies?

Year ____ month ____

9.5. With who in your household or outside your household do your choice of livelihood strategies?

- 1) On my own 2) With my family
3) With hired individuals 4) Other specify _____

9.6. What are the challenges you face in implementation of existing livelihood strategies?

(Multiple answer possible)

- 1) Limitation of technical support 2) Shortage of input 3) Lack of capital
4) Shortage of labor 5) Weakness of market linkage 6) Other specify ____

10. Agricultural Extension Services

10.1. Is there development agent in your kebeles? ____ 1) Yes 2) No 3) I don't know

10.2. Have you been visited by an extension agent in the past three month?

- 1) Yes 2) No

10.3. What were the purpose of this visits ____ (Multiple answer is possible).

- 1) To give advice on crop production 2) To give advice on animal production
3) To give advice on soil water and conservation 4) To collect taxes
5) To collect other debts 6) Other (specify) _____

11. Remittance

11.1. Have you receive remittance in the past 12 months? 1) Yes 2) No

11.2. From where did you get the remittance? _____

11.3. If yes in what way you receive? 1) In cash 2) In kind

11.4. If you receive remittance in cash, how much did you get in the past 12 month? _____

11.5. If you have received remittance in kind, what and how much did you get in the past Six Month? _____

11.6. What about the continuity of remittance that you get?

1) Sustainable 2) unsustainable 3) I don't know/I am not sure

Thank you very much for your kind cooperation!!