

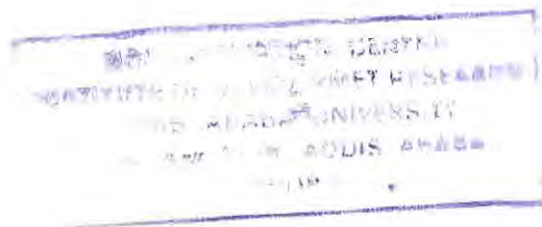
**Addis Ababa University**  
**School of Graduate Studies**  
**College of Development Studies**

**Diversification of Livelihood Activities as a Strategy of Promoting Household  
Food Security: A Case of Daro Lebu Woreda of West Hararghe Zone of  
Oromia Regional State, Ethiopia**

**A Thesis Submitted to the School of Graduate Studies of Addis Ababa  
University in Partial Fulfillment of the Requirements for the Degree of Master  
of Arts in Development Studies**

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**Addis Ababa**

**ADDIS ABABA UNIVERSITY  
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*Title*

*Diversification of Livelihood Activities as Strategy of Promoting Household Security. A case of Daro Lebu Woreda of West Hararghe Zone of Oromiya Regional State, Ethiopia.*

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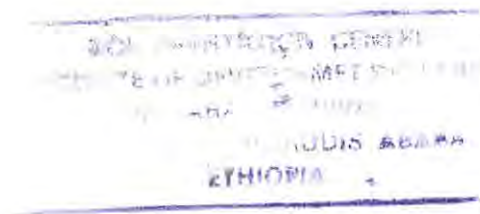
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## **List of Accronomy**

AE	Adult Equivalent
DFID	Department For International Development
DPPA	Drought Prevention and Preparedness
EEA	Ethiopian Economic Association
FAO	Food and Agricultural Organization
FGD	Focus group discussion
FHHHs	Female Headed Households
HHH	Household Head
IFAD	International Fund for Agricultural Development
IFRC	International Federation of Red Cross
KII	key informant interview
MHHHs	Male Headed Households
MoARD	Ministry of Agriculture and Rural Development
MRA	Minimum Recommendable Allowances
NFAP	Nonfarm Activity Participation
NGOs	Non-Governmental Organization
PAs	Peasant Association
TLU	Tropical Livestock Unit
WB	World Bank

## Abstracts

Currently diversification of livelihood activities has got special attention in terms of its contribution to household's food security. However, in our country little attention has been given to livelihood diversification and the numerous factors that determine the abilities of rural household's choice of different livelihood activities. Thus, this particular research was carried out with the aim of generating location specific data regarding the livelihood diversification and its role in attaining household's food security. A livelihood frame work has been adopted to see how the relationship between different characteristics of households and their livelihood resources affect the household's choice of diversifying livelihood activities which would in turn have a significant impact on household food security. A multi stage sampling procedure was employed to select 120 households of which 25% of them are female headed households. Household survey, case study, key informant interview, focus group discussion and observation were the principal method used to generate data. Descriptive statistics, income portfolio analysis, diversity index, multi-variant regression model and binary logit model was used to analyze quantitative data.

The income portfolio analysis revealed that agriculture still plays a pivotal role by contributing 61.7% of the total income of studied households and followed by nonfarm income which accounts for 30% of the total income of sampled households. Similarly the diversity index reveals that there is a difference in participation of nonfarm activity both among the sex and wealth status of households. Male headed households were highly diversifying their livelihood activities than female headed households. Likewise the better off households were more diversify their livelihood activities than poor and medium households.

The binary logit model result for determinants of livelihood diversification reveals that, from the 9 explanatory variables used in the model 6 of them were found to be significant to affect the household's engagement in diverse livelihood activities. Similarly multi-variant regression model was used to test the main determinants of household food security and the results of the model shows that, out of the 12 explanatory variables used in the model 4 of them are found to be the main determinants of household food security in the study area. In tandem to this, the relationship between the household's participation in diverse livelihood activities and their food security situation were analyzed through different statistical techniques and it was found that there is strong positive relationship between livelihood diversification and household food security. Those households who are diversifying their livelihood activities were better in terms of per capita calorie than those who are entirely depend on agriculture

## **Chapter One: Introduction**

### **1.1. Background of the Study**

Currently about a total of 925 million people are estimated to be undernourished in 2010, representing almost 16 percent of the population of developing countries (FAO, 2010). The majority of the world's undernourished people live in developing countries. Two-thirds live in just seven countries (Bangladesh, China, the Democratic Republic of Congo, Ethiopia, India, Indonesia and Pakistan) (FAO, 2010). When we come to sub-Saharan Africa the situations are becoming worse and worse. The regions constitute 239 million out of the world 925 million food insecure people and it is one of the world's most food-insecure region (FAO, 2010).

Ethiopia is a one of the sub Saharan Africa country with an estimated population of 73.9 is the third populous country in Africa. And its sex composition of the population is almost equal. According to 2007 estimate, population is growing at an estimated annual rate of 2.6. From the total population of the country approximately about 84% are rural population and the remaining is urban population (CSA, 2008). Agriculture is the main source of livelihood especially for the rural poor. According to IFAD (2006), Ethiopia is one of the world's poorest countries, where half of the population lives under the poverty line and agriculture is the main source of livelihood for more than eight out of ten Ethiopian. However, agricultural productions are extremely vulnerable both to climatic conditions and to the disruptive impact of war and civil conflict. Recurring droughts leave poor farming families without food crops, using periodic famine (IFAD, 2006).

The majority of Ethiopian populations are lived in the rural areas and majority of the populations are base their livelihood on agriculture. Due to the growth of a population in the rural areas and the resulting consequences of sub-division and fragmentation of land, added to this the problem of drought due to erratic rainfall, deforestation, soil erosion and lack diversification of portfolio of livelihood strategies exacerbate the problem of food insecurity and income poverty in many rural parts of Ethiopia.

Food insecurity is a widespread problem in Ethiopia. Despite ample resources and agro-climatic stability for production, Ethiopia couldn't achieve food self sufficiency yet and a significant share of the population depends on food aid and the number population vulnerable to famine and

food insecurity increases during unfavorable years of drought, (EEA, 2004/5). In Ethiopia there are a significant number of chronically food insecure people who permanently need food aid even during normal rainfall year (EEA, 2004/5).

Regardless of substantial resources invested each year by the Government and its partners to reduce food insecurity, both chronic and transitory food insecurity problems continue at the household level (FAO/WFP, 2010). The limited opportunities for livelihood diversification due to absence of supplementary income from other non-farm activities, has made the Ethiopian rural poor more vulnerable (Asmamaw, 2005).

### **1.1. Statements of the problem (justification)**

Ethiopia's poverty and vulnerability to food insecurity make it a place of recurrent emergencies. An estimated 5–6million people are considered chronically food insecure – that is, they require some type of resource transfer (traditionally food aid) to meet their minimal food requirements every year (Nicholas Haan et al, 2006). Smallholder farming is the dominant livelihood activity for the majority of Ethiopians, but it is also the major source of vulnerability to poverty, food insecurity and, recurrent famines (Devereux and Guenther, 2007). According to Devereux et al, (2005), due to the problem of erratic weather and failed harvests every few years, the Ethiopian smallholders are trapped in a low productivity trap, with plots that are too small to generate livelihoods from agriculture alone (Devereux et al, 2005).

Different literatures explain the major causes of food insecurity in Ethiopia. For instance, MoARD, (2006), states, the major causes of food insecurity in Ethiopia such as land degradation, recurrent drought, population pressure and subsistence agricultural practices characterized by low input and low output. Combinations of natural and man-made factors have resulted in a serious and growing food insecurity problem in many parts of the country (FDRE, 2006).

Different literature shows about the importance of livelihood diversification in terms of reducing food insecurity and poverty particularly, for rural households who base their livelihood entirely on agriculture. As it stipulated by Ellis and Allison, (2004), diversification can assist households to insulate themselves from environmental and economic shocks, trends and seasonality – in effect, to be less vulnerable. Diversification has positive impacts for poverty and vulnerability

reduction and it contributes to lessening vulnerability by ameliorating risk and reducing the adverse consumption effect of seasonality (Ellis, 2004).

Similarly, the study which was conducted in four African countries i.e, Uganda, Kenya, Tanzania and Malawi, indicate that, securing better living standards is a cumulative process that requires an ability to build assets and diversify across farm and non-farm activities (Ellis and Freeman, 2004).

In Ethiopia, undiversified livelihood options and complete dependency on agricultural production is also the main problems which exacerbate food insecurity in rural area. The ability to diversify at all is often critical to the food security of the most vulnerable rural populations, (Ellis, 2004). In many rural areas, agriculture alone cannot provide sufficient livelihood opportunities. Rural people's livelihoods are derived from diverse sources and are not as overwhelmingly dependent on agriculture as previously assumed (Gordon and Catherine, 2001). According to Asmamaw, (2004), the limited opportunity for livelihood diversification, due to absence of supplementary income from other non-farm activities has made the Ethiopian rural poor more vulnerable. Given the inability of most Ethiopian smallholders to make a living from agriculture, because of resource constraints and recurrent shocks, increasing policy attention has turned to supporting alternative livelihood activities (Devereux et al, 2005). Similarly, Dessalegn (2003), as cited in Asmamaw (2004), argues that the decline in the size of cultivable land is envisaged to further exasperate the currently observed worse food insecurity situation unless non-farm activities are made to compensate for the livelihood stress prevalent in the rural areas.

Like many other parts of the country, West Hararghe is one zone of Oromia regional state. It is one of the areas which are most severely affected by drought (IFRC, 2002). Land fragmentation, loss of soil fertility, and droughts are the factors which make the population of the area susceptible to food insecurity and income poverty. Similarly, Daro Lebu woreda (the study area) being one of the woreda in west Hararghe is one of the drought prone woreda (DPPA, 2006). The prevalence of global and severe acute malnutrition is considered poor in the presence of aggravating factors such as limited access to safe drinking water, high morbidity rate and low measles vaccination coverage (DPPA, 2007). The majority of the population is agrarian and largely meher-dependent. Most parts of the woreda are predominantly food insecure due to the reliance on erratic rainfall (DPPA, 2007).

Despite the persistence of poverty and food insecurity situation that are prevailed in the study area, still no further research was done regarding livelihood diversification strategy of the population, poverty and food insecurity situation. However, many researches were done on food security and livelihood in many parts of the country. The food insecurity situation, livelihood diversification and livelihood options of the populations are different from one area to the other and among households even it differs within individuals in the households. Generally, understanding the livelihood diversification strategy of the households would help to design policy option that should cater the food security problem of the community. According to Barret et al, (2001), the study of diversification behavior offers important insights as to what sorts of interventions might be effective in reducing poverty and vulnerability. Understanding livelihood diversification strategy of different households in different area is important in Ethiopia to design good policy option that should directed to curb the problem of food insecurity. Therefore, this specific research is designed to generate location specific data, regarding livelihood diversification role of promoting food security and the livelihood diversification option and strategy pursued by the households in the study area.

### **1.3. Research question**

In view of the above stated research problem, this research addressed the following questions:

1. What is the livelihood asset, livelihood activities and determinants of livelihood diversification of the households in the study area?
2. Why there is a difference between the livelihood activities pursued by different households?
3. What are the main determinants of food security in the study area?
4. Which segments of the households of the study area are mostly engaged in livelihood diversification? Are they better-off or poor?

#### **1.4. Objective of the study**

The general objective of this thesis is to examine and understand the different livelihood diversification strategies pursued by the households and the extent to which these livelihood diversification strategies contribute to the household food security.

The Specific objective of this research is:

- To identify livelihood diversification strategies and its determinants of the households in the study area.
- To asses and examine the extent and the way livelihood diversification contributes to household food security in the study area.
- To identify and examine those households who are mostly engaged in diversification of livelihood activity.

#### **1.5. Significance of the Study**

Understanding the diversification of livelihood activity of the households is essential to understand the food security situation of that particular society. Since this research generates information and data about the livelihood diversification and food security situation of the population, it might contribute a lot in shedding a light in the way the policy officials responds to the problem. Furthermore, this particular research is expected to inform the local authorities and the NGOs working in the Daro Lebu woreda in terms of improving their knowledge base on the role of diversification of livelihood activities in household food security. Besides the above advantage, since there is no any research which was done on diversification of livelihood activities in the study area, this particular research generates some literature on livelihood diversification and food security in Daro Lebu woreda in particular and in Ethiopia in general.

#### **1.6. Scope and Limitation of the Research**

Due to time and resource constraint, this study confined itself to only three PAs of Daro Lebu woreda of west Hararghe. Households are the unit of analysis in this study. This study was emphasizing only on household level situations by taking 'snap-shot' at a particular period of time. In addition to the above limitation, due to time and financial limitation the sample size was restricted to only 120 households and this might have an impact on the quality of the research.

## Chapter 2: Literature Review

### 2.1. The concepts of livelihood

In many literatures the most widely quoted and accepted definition of livelihood is the one which is forwarded by Chambers and Conway (1991):

*Livelihood comprises the capabilities, assets (store, resources, claim and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets and provide sustainable opportunities for the next generations and which can contribute net benefit to other livelihoods at the local and global level and in the short run and long run.*

The livelihood is sustainable if it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base, (Chambers and Conway, 1991; Hussein and Nelson, 1998). A livelihood is therefore defined as the activities, the assets and the access that jointly determine the living gained by an individual or household (Masefield, 2001). As it is outlined by Ellis and Allison (2004), the term livelihood attempts to capture not just what people do in order to make a living, but the resources that provide them with the capability to build a satisfactory living, the risk factors that they must consider in managing their resources, and the institutional and policy context that either helps or hinders them in their pursuit of a viable or improving living. Similarly Lipton and Maxwell, (1992) cited in Ellis, (1998) states that a livelihood is more than just income, and it encompasses income, both cash and in kind, as well as the social institutions (kin, family, compound, village and so on), gender relations, and property rights required to support and to sustain a given standard of living (Ellis, 1998).

To get a deep insight of the food insecurity or poverty situation of the households or individuals, analyzing their livelihood situation is accorded primacy. The concepts of livelihood are too broad and it captured many elements which are directly or indirectly depend on each other. According to Ellis, (2000) a livelihood comprises the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institution and social relation) that together determine the living gained by the individual or households. Generally, when we say the livelihood of the households, it should have to encompass all of the components which were explained above. It is worth to discuss each of the above components which constitute livelihood one by one.

### 2.1.1. Livelihood Resources (Assets)

The ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession and livelihood resources (Assets) may be seen as the 'capital' base from which different productive streams are derived from which livelihoods are constructed (Scoones, 1998). Different literature categorizes the livelihood assets in to five. For instance, DFID (1999), identified five core asset categories or types of capital upon which livelihoods are built. These five categories of assets are: Natural capital, Financial capital, Physical capital, Human capital and Social capital.

**Human Capital;** human capital represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives (Scoones, 1998: DFID, 1999).

**Social Capital:** the social resources (networks, social claims, social relations, affiliations, associations) up on which people draw when pursuing different livelihood strategies (Scoones, 1998; Ashley, 2000). According to DFID (1999), the social capital is social resources such as networks and connectedness, that increase people's trust and ability to work together and expand their access to wider institutions, such as political or civic bodies; membership of more formalized groups which often entails adherence to mutually-agreed or commonly accepted rules, norms and sanctions; and relationships of trust, reciprocity etc, upon which people draw in pursuit of their livelihood objectives.

**Financial Capital:** the capital base (cash, credit/debt, savings, and other economic assets, including basic infrastructure and production equipment and technologies) which are essential for the pursuit of any livelihood strategy (Scoones, 1998; DFID, 1999).

**Physical Capital:** physical capital comprises the basic infrastructure such as roads, rails and telecommunications, affordable transport, secure shelter and buildings, adequate water supply and sanitation, clean affordable energy, access to information (communications) and producer goods needed to support livelihoods (DFID, 1999).

**Natural Capital:** the natural resource stocks (soil, water, air, genetic resources etc.) and environmental services (hydrological cycle, pollution sinks etc) from which resource flows and services useful for livelihoods are derived ( Scoones, 1998)

### **2.1.2. Vulnerability Context (Trends and Shocks)**

The Vulnerability Context refers to seasonality, trends, and shocks that affect people's livelihoods (DFID, 1999). It is the factor which is in most cases out of the control of the households but which have an impact on livelihood of the population. Livelihood activities are influenced by 'shocks' and 'trends' that are in varying degrees exogenous to household and to local circumstances (Ellis, 2000 cited in Degefa, 2005). The livelihood and survival of human individual, household, groups and communities are vulnerable to stress (pressure which are continuous and cumulative, predictable and distressing, such as seasonal shortage, rising population or declining resources) and shocks (such as wars, persecution, civil violence, droughts, storms, floods epidemics and etc.) (Chambers and Conway, 1991: 10). According to Chambers and Conway (1991), reducing vulnerability has two dimensions: the first is external through public action to reduce external stress and shocks through flood prevention, disaster preparedness, off-season public works to provide employment, prophylaxis against disease, and the like and the second is internal through private action, in which a household adds to its portfolio of assets and repertoire of responses so that it can respond more effectively and with less loss.

### **2.1.3. Mediating Process (Policy, Institution, and Process (PIP))**

Before proceeding to further discussions, clarifications of the above three factors, i.e., institutions, policies and processes is needed. A process, in the context of sustainable livelihood, refers to processes of change in policies, institutions and organizations (DFID, 1999). According to Davies (1997) cited in Scoones, (1998), "Institutions are the social cement which link stakeholders to access to capital of different kinds to the means of exercising power and so define the gateways through which they pass on the route to positive or negative livelihood adaptation". Since formal and informal institutions (ranging from tenure regimes to labour sharing systems to market networks or credit arrangements) mediate access to livelihood resources and in turn affect the composition of portfolios of livelihood strategies, hence, an understanding of institutions and organizations is therefore key to designing interventions which improve sustainable livelihood outcomes, (Scoones, 1998). Policies, institutions and processes determine, amongst other things: poor people's access to various assets (such as land or labour), (DFID, 1999). In many developing countries, policies and institutions discriminate against those

with few assets and disadvantage poor people. Such discriminatory policies and institutions undermine development efforts to eradicate poverty (Scoones, 1998).

#### **2.1.4. Activities and Livelihood Strategies**

The livelihood strategies are a portfolio of different activities and tasks that households pursue to have a viable outcome. While undertaking different livelihood strategies, the households perform different activities. According to DFID, (1999) livelihood strategies are the range and combination of activities and choices that people make/undertake in order to achieve their livelihood goals (including productive activities, investment strategies, reproductive choices, etc.). The livelihood strategies of rural households vary enormously, but a common strategy is for household members to undertake a range of activities which each in some way contributes to one or more of household needs (Ashley, 2000). Basically there are three broad clusters of livelihood strategies which are identified by Scoones, (1998), these are: agricultural intensification/extensification, livelihood diversification and migration.

#### **2.1.5. Livelihood Outcome**

Livelihood Outcomes are the achievements or outputs of livelihood Strategies (DFID, 1999). It is the product of the interplay between the context factor, mediating process, asset, livelihood strategy and the policy, institution and process. The outcome might be either positive or negative. Poverty and food insecurity are from among the negative livelihood outcome.

### **2.2. The Concepts of Livelihood Diversification**

Livelihood diversification is defined as the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living (Ellis, 1998). As it explained by Hussein and Nelson (1998), livelihood diversification refers to attempts by individuals and households to find new ways to raise incomes and reduce environmental risk. According to Start and Johnson (2004), diversification can either refer to an increasing multiplicity of activities (regardless of the sector), or it can refer to a shift away from traditional rural sectors such as agriculture to non-traditional activities in either rural or urban space – i.e. sectoral change.

Ellis, (1998) tried to differentiate the difference between livelihood diversification and income diversification. He noted that, income diversity refers to the composition of household incomes

at a given instant in time where as diversification, on the other hand, is an active social process whereby households are observed to engage in increasingly intricate portfolios of activities over time. Livelihood strategies should not be assumed to be homogenous across households, or even among individuals within households. Livelihood strategies and outcomes are sensitive to combinations of age and gender, as well as to other socially constructed identities/institutions such as class, education, ethnicity, and religion (Lautze et al, 2003).

The primary categories of livelihood diversification are farm, off-farm, and non-farm income sources (Saith, 1992 cited in Ellis, 1998). Ellis (1998) explained the farm, off-farm and non-farm diversification. According to Ellis, farm income includes livestock as well as crop income and comprises both consumption-in-kind of own farm output and cash income from output sold. Off-farm income typically refers to wage or exchange labour on other farms (i.e. within agriculture). It also includes labour payments in kind, such as the harvest share systems and other non-wage labour contracts that remain prevalent in many parts of the developing world. Non-farm income refers to non-agricultural income sources. The same author further classifies non-farm income in to five categories. These are (i) non-farm rural wage employment, (ii) non-farm rural self-employment, (iii) property income (rents, etc.), (iv) urban-to-rural remittances arising from within national boundaries, and (v) international remittances arising from cross-border and overseas migration.

Different literatures note the reason for livelihood diversification. Here it is worth to mention Ellis, (2000) work. He categorizes the reason for livelihood diversification in to two broad categories which are necessity or choice. He further elaborates Necessity as involuntary and desperation reasons for diversifying (E.g., the dispossession of a tenant family from its access to land, fragmentation of farm holdings on inheritance, environmental deterioration leading to declining crop yields, natural or civil disasters such as drought, floods or civil war resulting in dislocation and abandonment of previous assets, or loss of the ability to continue to undertake strenuous agricultural activities due to accident or ill health). Choice on the other hand, refers to voluntary and proactive reasons for diversification for instance, seeking out seasonal wage earning opportunities, travelling to find work in remote locations, educating children to improve their prospects of obtaining non-farm jobs, saving money to invest in non-farm businesses such as trading and etc.

### **2.2.1. Determinants of Livelihood Diversification**

Different literature has list and explain the various determinants of livelihood diversification in different ways, though the gist of the concepts are interrelated. For instance, Barret and Reardon (2000), list some of the determinant of livelihood diversification such as risk, diminishing or time-varying returns to labor or land, market failures (e.g., for credit) or frictions (e.g., for mobility or entry into high-return niches), and risk management, either ex-ante mitigation through portfolio choice or ex-post coping through adaptation to shocks.

On the other hand, Ellis (1998), mentioned some of the main determinants of diversification such as seasonality, differentiated labour markets, risk strategies, coping behavior, credit market imperfections, and inter temporal savings and investment strategies. Likewise the study which was conducted by Smith et al, 2000 in Uganda states a history, social context and agro-ecology, and the influence of ongoing social change linked with external interventions, such as infrastructural and service provision as the determinants factor for livelihood diversification.

From DFID evidence of research on Uganda, Tanzania, India, South America, Armenia, Georgia and Romania, Junior R. Davis, (2003), list six factors which determine access to rural diversification out of farming to non-farm, such as education and skills, social capital, ethnicity and caste, gender dynamics, financial capital, and physical infrastructure and information. Generally the determinant of livelihood diversification is different from one area to other even it is different between households and between individuals within households. Here some of the common determinants of livelihood diversification which are raised by many researchers are listed below.

#### **2.2.1.1. Seasonality as Determinant Factor for Livelihood Diversification**

Seasonality is one of the determinants of livelihood diversification in many rural areas. Since the agriculture is seasonal in nature for those rural areas where there is no irrigation facility, it is natural to observe households engagement in different activity such as casual labor in rural area, migration to nearby city to search for work and like. This is particularly true during lean season. The cyclical levels of activity implied by seasonality apply mostly to landless rural families that depend on agricultural labour markets for survival, as for farm families (Ellis, 1998). when the (seasonal) income from farming drops to levels not sufficient for survival in the off-season,

households are pushed into nonfarm activities to smooth income and consumption inter-seasonally (Reardon et al, 2006).

#### **2.2.1.2. Asset as a Determinant Factor**

Asset is one of the determinant factors for livelihood diversification. Availability of key-assets (such as savings, land, labor, education and/or access to market or employment opportunities, access to common property natural resources and other public goods) is an evident requisite in making rural households and individuals more or less capable to diversify ( Dercon and Krishan 1996; Abdulai and Crole Rees 2000 cited in Warren, 2002). On the other hand diversification may also develop as a coping response to the loss of capital assets needed for undertaking conventional on-farm production (Warren, 2002). According to Barret et al (2001), households endowed with insufficient productive agrarian capital (land and livestock) to absorb their household's full labor endowment are compelled to seek out off-farm or non-farm income sources in the absence of complete and well-functioning markets in land and livestock. On the other hand those households with more assets tend to have a greater range of options and an ability to switch between multiple strategies to secure their livelihoods (DFID, 1999).

#### **2.2.1.3. Risk Management**

The risky nature of agriculture helps to explain the high levels of diversification in rural areas (Start, 2001). Distinct role of diversification is to cope ex post shocks to income and diversification is a primary means by which many individuals reduce risk (Barret et al 2001). Warren (2002), pointed out that the previous experience of crop or market failure can provoke diversification as a means of spreading perceived risk and reducing the impact of total or partial failure on household consumption. On the other hand Ellis (2000), stated that income diversification as a risk strategy is often taken to imply a trade-off between a higher total income involving greater probability of income failure, and a lower total income involving smaller probability of income failure. One of the critical motives of livelihood diversification for risk reasons is the achievement of an income portfolio with low covariate risk between its components. This means that the factors that create risk for one income source (e.g. climate) are not the same as the factors that create risk for another income source (e.g. urban job insecurity (Ellis, 2000).

#### **2.2.1.4. Labour Market**

Labour markets also offer nonfarm opportunities for income generation differentiated by other considerations such as education, skills, location and gender. When the marginal return to labour time in farming for any individual falls below the wage rate or the return to self-employment attainable for that person off the farm, then, ignoring intra-household distributional issues, the household as a unit is better off switching that individual into off-farm or nonfarm activities (Ellis, 2000).

#### **2.2.1.5. Credit Market Failures**

Missing credit markets can impede diversification into activities or assets characterized by substantial barriers to entry (Barret et al, 2001). On the other hand, if non-farm or off-farm options can be accessed easily, but credit markets are thin or missing, non-farm earnings can be a crucial means for overcoming working capital constraints to purchasing necessary variable inputs for farming (e.g., fertilizer, seeds, equipment, labor) or to making capital improvements (e.g., bunds, ridges, irrigation) to one's farm (Reardon et al., 1994; Savadogo et al., 1998; Reardon et al., 1999 cited in Barret et al, 2001). Credit or insurance market failure, will drive households to self-insure and self-fund input purchases (Reardon et al, 2006). Weaknesses in rural factor markets likewise tend to encourage household diversification. Where credit and insurance markets are missing, rural nonfarm activity becomes a vehicle for self-insurance and for financing agricultural inputs and assets via nonfarm earnings and weak land and labor markets may also encourage diversification (Reardon et al, 2006).

### **2.3. The Concepts of Food security**

Since the world food conference the concept of food insecurity has evolved, developed, multiplied and diversified (Maxwell, 1996). In the 1974 World Food Conference, food security was defined as:

‘Availability at all times of adequate world food supplies of basic foodstuffs . . . to sustain a steady expansion of food consumption . . . and to offset fluctuations in production and prices’ (UN, 1975 cited in Maxwell, 1996).

The 1974 world food conference states that, every man, woman and child have the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties. Furthermore the conference has made all concerned state

responsible, in accordance with their sovereign judgment and internal legislation to remove the obstacles to food production and to provide proper incentives to agricultural producers, (UN, 1975). At that time the focus of the debate was on strengthening food production to increase availability and stability of world food supplies of basic foodstuffs, particularly cereals, to meet increasing demands, (Mechlem, 2004). Such demands were triggered by population growth and the occurrence of a drought across many major grain-producing countries that had led to heavy demands on international grain markets, (R. Stringer, 2002 cited in Mechlem, 2004).

According to Gonzalez (2010), the Sen's (1981), entitlement theory centered the problem of food insecurity on access to food and it was found that famines occurred even when there was no significant shortage of food in stock. The theory stated that constant supply of food might exist side-by-side with poverty and hunger if people lacked access to it. Having Influenced by the Sen's entitlement theory, In 1983, FAO expanded its concept to include a third aspect - securing access by vulnerable people to available supplies implying that attention should be balanced between the demand and supply side of the food security equation (Clay, 2002). Later on the World Bank in 1986 redefined the food security and this definition is still the one which is mostly cited in many literatures. According to the World Bank (1986) food security is:

“Access by all people at all times to enough food for an active and healthy life”.

The essential elements of this definition are the availability of food and the ability to acquire it. The document of the World Bank (1986), further classify the definition of food insecurity in to two; chronic and transitory. Chronic food insecurity is a continuously inadequate diet caused by the inability to acquire food and it affects households that persistently lack the ability either to buy enough food or to produce their own. On the other hand transitory food insecurity is a temporary decline in a household's access to enough food and it results from instability in food prices, food production or household incomes-and in its worst form it produces famine.

The broader definition of food security was also given by the World Food Summit in 1996: the definition is as follows;

'food security, at the individual, household, national, regional and global levels is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life'(ODI, 1997).

From the above definition achieving food security requires that the aggregate availability of physical supplies of food is sufficient, that households have adequate access to those food supplies through their own production, through the market (given sufficient purchasing power) or through other sources, and that the utilization of those food supplies is appropriate to meet the specific dietary needs of individuals (Hahn, 2000).

### **2.3.2. Food security and insecurity in Ethiopia**

Ethiopia is one of the poorest countries in the world, requiring continuously high levels of humanitarian and development assistance (Haan et al, 2006). In the ten years from 1994 to 2003, an average of five million Ethiopians were declared “at risk” and in need of emergency assistance, and since 1998 the numbers of food aid beneficiaries in Ethiopia have fluctuated between 5 and 14 million every year. However, a high proportion of households that receive emergency food aid, or work on public works projects, every year are not “famine prone” but are “chronically food insecure” – they face predictable annual food deficits caused by agricultural production constraints and poverty (Devereux et al, 2006). Ethiopia suffers from structural as well as transitory food deficits, requiring substantial commercial and concessional imports in non-drought years and extremely high levels of food aid in drought years (Devereux, 2000).

Different literature explains several factors as a challenge to food security in Ethiopia. The major causes of food insecurity in Ethiopia are; recurring drought, limited sources of alternative incomes, population pressure, limitations in technology, diminishing land holding, lack of product diversification, policy induced stagnation of agriculture, internal conflict and instability and market integration, limited capacity in planning and implementation, environmental degradation, and limited access to credit (Haan et al, 2006; FDRE, 2002,; PRSP, 2002).

In Ethiopia food security is divided in two categories of the chronic food insecurity (Perceived as a result of overwhelming poverty indicated by a lack of assets) and acute food insecurity (more of transitory phenomenon related to man-made and unusual shocks such as drought (FDRE, 2002).

According to Ethiopia Food Security Strategy of (2002) both chronic and transitory problem of food insecurity are widespread and severe in Ethiopia.

**Table 1: Indicative category of food insecure households in Ethiopia.**

<b>Chronic</b>	<b>Rural</b>	<b>Urban</b>	<b>Others</b>
	Resource poor household -land-less or land-scarce -oxen-less -poor pastoralist -female-headed households -elderly -disabled and sick -poor agricultural households -newly established settlers	-low income households employed in informal sector -those outside the labour market. -elderly -disabled and sick -some female headed household -street children	-refugees -displaced people
<b>Transitory</b>	-less resource households vulnerable to shocks -farmers and others in drought prone areas -Pastoralist Others vulnerable to economic shocks. Eg, in low potential area	-urban poor vulnerable to economic shocks, especially those causing food prices right	-groups affected by temporary civil unrest

Source; FDRE (2002)

#### **2.4. The Role of Livelihood Diversification in Promoting Food Security and in Reducing Poverty.**

The importance of livelihood diversification in attaining food security is well documented by different researchers in many literatures and there is a wealth of literatures in this regard. In recent years, globalization, urbanization, and improved infrastructure have opened up new opportunities in many rural areas, thereby reducing their dependence on agriculture as the primary engine of rural growth and Policymakers hold high hopes that rural nonfarm growth can offer a pathway out of poverty for a large segment of the rural poor (Haggblade et al, 2009).

If progress is to be made in combating rural African poverty, donors and policymakers must recognize that rural African households draw heavily on off-farm and non-farm income sources (Barret et al, 2001). A growing literature identifies the diverse livelihood strategies followed by rural households as a phenomenon to an improved policy environment for tackling rural poverty

(Ellis, 2001). In many literatures it was widely acknowledged that agriculture particularly that of small scale agriculture would not in a position to guarantee the rural households with food security. Agriculture on its own often cannot provide the means of escaping out of poverty for the majority of rural poor. The poor are observed to diversify income sources in order to cope with risk, seasonality and other adverse factors in agriculture, but almost no recognition has been given to diversification by the policy processes till now (Ellis, 2004).

Most of the rural poor in developing countries including Ethiopia are dependent on subsistence agriculture which is mostly vulnerable for different trends and shocks; hence, engagement in diversified livelihood activity would help them to build resilience in the presence of the above aggravating factors. In line with this statement Masefield (2001), note that a diverse portfolio of activities contributes to the sustainability of a rural livelihood because it improves its long-term resilience in the face of adverse trends or shocks. Gladwin et al. (2001) cited in Owusu and Abdulai, (2009), have noted that addressing food insecurity in Africa through increased food production may be inadequate, so efforts must be geared toward improving returns of farmers through expansion of non-farm employment opportunities.

In most of the developing countries where there is a pressing problem of land degradation, diversification can play a great role in attaining food security due to the fact that the diversified income would contribute a lot to household income. In Sub Saharan Africa natural resource-based livelihoods are no longer able to provide a secure long-term livelihood, due to the fact that problem of land sub-division at inheritance causing plots to become less viable for family food security (Ellis, 2001). This implies the importance of diversification in Sub Saharan Africa in terms of fostering food security. Reardon et al (1992), cited in Ellis (2004) note that diversification can certainly improve food security in the face of high risks of drought or other climatic disturbances. Similarly, Haggblade et al, (2002), argue that since nonfarm income proves important for financing on-farm investments, nonfarm earnings become important to food security both directly by helping the poor to buy food and indirectly by financing the purchase of farm inputs necessary to increase food production. Non-agricultural economic activity enhances household economic viability and food security by fulfilling critical cash and food deficits when agricultural production falls short, and also by enabling households to avoid grain sales (Fleuret 1989; Shipton 1990 cited in Yared, 2001).

Nonfarm activity is typically positively correlated with income and wealth (in the form of land and livestock) in rural Africa, and thus seems to offer a pathway out of poverty if nonfarm opportunities can be seized by the rural poor, (Barret et al, 2001). The case study which was conducted in Burkinafaso both after and before 1984 drought by Reardon and Matlon, (1989) cited in Barret and Reardon, (2000), illustrates that households with greater income diversification were able to buy food and withstand the effects of the drought, and tended to have higher overall incomes than those who were not able to supplement their farm incomes with rural nonfarm. Gordon and Craig, (2001), raised the potentially important role for rural nonfarm activities in reducing poverty in rural area through absorbing surplus labour in rural areas, helping farm-based households spread risks, offering more remunerative activities to supplement or replace agricultural income, offering income potential during the agricultural off-season, and by providing a means to cope or survive when farming fails. Non-farm incomes provide the cash that enables a farm household to purchase food during a drought or after a harvest shortfall and is also a source of farm household savings, used for food purchase in difficult times (Gordon and Craig, 2001).

As far as empirical data regarding the contribution of livelihood diversification to food security is concerned, the data is very scanty, however, it is important to note the contribution of livelihood diversification in terms of its contribution to the rural household income due to the fact that diversified income sources has played a great role in promoting food security and in reducing income poverty particularly for rural households. Despite the persistent image of Africa as a continent of "subsistence farmers," nonfarm sources may already account for as much as 40-45% of average household income and seem to be growing in importance (Bryceson and Jamal, 1997; Reardon, 1997; Little et al., 2001 cited in Barret et al, 2001). According to Reardon, (1997) cited in Ellis,(2000), 30 and 50 % of rural household income in Sub Saharan Africa is derived from non-farm sources. In some regions, e.g. southern Africa this can reach 80-90 percent (May, 1996; Baber, 1996 cited in Ellis, 2000). Similarly, Ellis, (2000), illustrates the contribution of different livelihood activities in terms of their contribution to household total income in Sub Saharan Africa. He states that 40 percent of income of the households in sub Saharan Africa are generated by farm activities (own-account agriculture), while off-farm activities (agricultural wage labour and gathering) and non-farm activities contributes 18 and 42 percent of the household income. On the other hand Reardon et al, (1998) cited in Reardon et al

(2000), note that from 1970-1990s it was found that the contribution of non-farm income was an average share of 42 per cent in total rural household income in Africa, 40 per cent in Latin American and 32 percent in Asia. There is also evidence that the importance of non-farm income has been increasing over the past few decades.

## **2.5. The Existing Ethiopian Government Policies and Strategies on Livelihood Diversification Role of Food Security.**

Currently livelihood diversification has given special concern in terms of promoting food security and reducing income poverty in many developing countries. In Ethiopia different researchers also prescribes livelihood diversification as a panacea to the existing food insecurity and poverty situation. For instance Devereux et al, (2005), argue that most Ethiopian smallholders were unable to make a living from agriculture because of resource constraints and recurrent shocks; hence, increasing policy attention has turned to supporting alternative livelihood activities. The government of Ethiopia has designed different policies and strategies and in those documents livelihood diversification has given due attention in promoting food security.

The livelihood diversification has been given emphasis in major development strategies of the government in promoting food security particularly in the drought prone areas. In sustainable development and poverty reduction program (SDPRP) of the FDRE, the government gives some emphasis particularly on the expansion of off-farm activity as a strategy of attaining food security. For instance, in SDPRP, the government planned to encourage off-farm income generating activity by designing employment and income generation schemes and through establishing micro and small scale enterprises in rural areas as a strategy to attain food security especially in drought period. Furthermore, the expansion of off-farm activities was given due emphasis as a strategy of attaining food security in drought prone areas.

As far as Plan for Accelerated Development to End Poverty was concerned (PASDEP), livelihood diversification was given a concern as one of the key intervention strategy designed to attain household food security. The document acknowledges and states that as the food insecure households are resource poor, living in drought-prone and degraded areas, focusing on crop and livestock production alone may not entirely solve the problem of food insecurity in some areas. For such areas, income diversification through promoting nonagricultural activities is of given

paramount importance (FDRE, 2006). Furthermore in PASDEP the government has designed different interventions which are important for both agricultural and non-agricultural activities to attain food security. For instance supports to alternative or supplementary income sources in non-farm activities including strengthening market effectiveness, credit services through micro-finance institutions, establishment of marketing cooperatives to be able to sell products at good price, and provision of training, and organization of cooperatives.

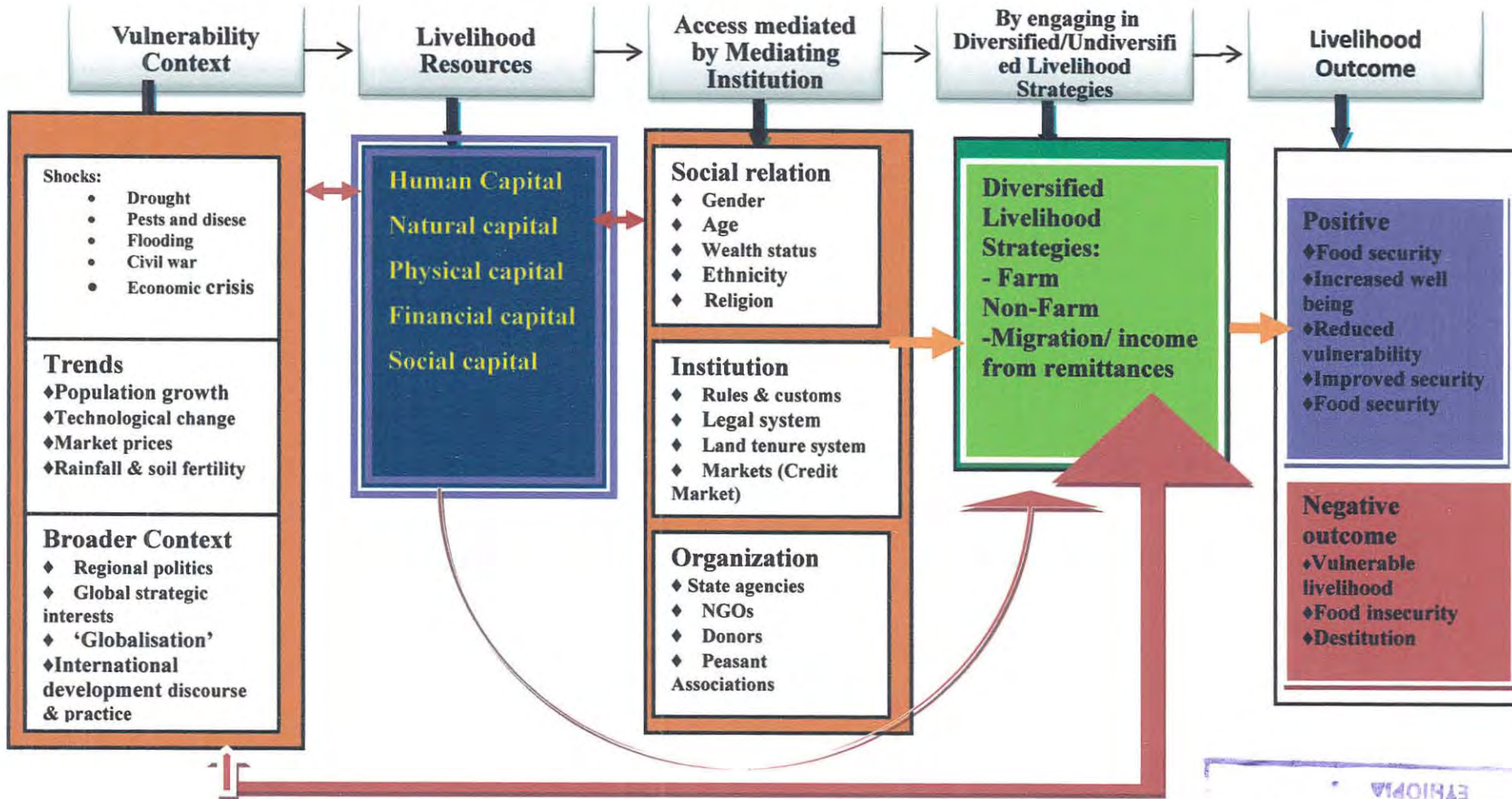
When we come to the current Growth and Transformation Plan (GTP) that are going to be implemented for the next five year, Smallholder agriculture are acknowledged to be continuing as the source of growth. The current GTP was developed based on the strengths of the PASDEP, but the special focus is also given to industrial growth. In GTP livelihood diversification particularly off-farm and non-farm diversification is noted as a strategy to attain food security especially in moisture deficit area. The food security program that has been implemented in PASDEP was acknowledged and will continue to be a strategy to attain food security in GTP. Off-farm and non-farm income generating activities are one of the four strategies to attain food security. In addition, those rural households who have very small plots and landless youth and women will be encouraged to engage in non-farm income generating activities with adequate support in terms of preparing packages, provision of skill and business management trainings, provision of credit and facilitating markets, so that they can ensure their food security (MoFED, 2010).

## **2.6. Conceptual Framework**

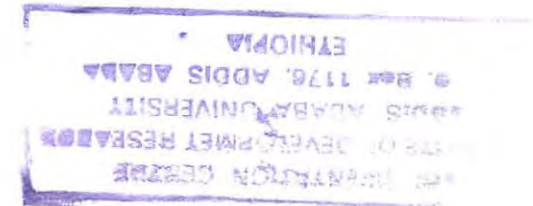
To undertake this research sustainable livelihood frame has been employed as analytical method. The sustainable livelihoods framework presents the main factors that affect people's livelihoods, and typical relationships between these factors. Furthermore the livelihoods framework is a tool to improve our understanding of livelihoods, particularly the livelihoods of the poor (DFID, 1999). Since the framework is people centre, analysis is most likely to begin with simultaneous investigation of people's assets, their objectives (the Livelihood Outcomes which they are seeking) and the Livelihood Strategies which they adopt to achieve these objectives(Ibid). Livelihoods approaches might provide a practical toolkit for linking the analysis of food insecurity with a multi-dimensional and people-centered analysis of poverty – looking beyond income and consumption levels to include an assessment of people's strategies, assets and capabilities (Devereux et al, 2004). The Potential for a livelihoods based analytical framework to generate improved approaches to poverty and food security measurement is very promising.(Ibid). According to Karim Hussein on his paper on the relevance of livelihood approach to food security he pointed out that there is a broad consensus that livelihoods approaches should be central to food insecurity measurement at the sub-national level due to their holistic character and fit with diverse household circumstances and regional realities and livelihoods analysis is also likely to be key to interpreting the relationship between short and long term phenomena that affect food security particularly at the national level(Hussein, Undated).

Since this particular research is focused on diversification of livelihood activities and households food security situation, the application of the sustainable livelihood framework would help to understand how the vulnerability context, policies, institutions and mediating institutions would affect the livelihood asset endowment of the community, diversification of livelihood activities pursued by the population and the resulting food security situation of the population. Furthermore, the framework helped to understand how the interplay between the contextual factor, the livelihood asset status of the households, and the institution and social relation will shape the livelihood diversification abilities of the households which in turn would have a significant impact on food security status of households.

Figure 1: Sustainable Livelihood Frame Work



Source: Adapted from Scoones, (1998), Devereux, (2000) and Degefa, (2005)



## **2.7. Operational Definition of Concepts**

**Diversification of Livelihood Activities.** Is defined as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to improve their standard of living (Ellis, 2000). In this study diversification of livelihood is conceptualized as the engagement of households in diverse livelihood activity apart from agriculture. Hence, the term is frequently used in this study as synonym word with nonfarm activity.

**Nonfarm Activity:** Different researchers explain the term nonfarm activity in different ways. For instance, Ellis (2000) classifies the term nonfarm activity in to five. These are (i) non-farm rural wage employment, (ii) non-farm rural self-employment, (iii) property income (rents, etc.), (iv) urban-to-rural remittances arising from within national boundaries, and (v) international remittances arising from cross-border and overseas migration.

In this study participation in non-farm activity is refers to the participation of households in any non-agricultural activity apart from crop production and livestock rearing. Such activity may include activities such as wage labour, chat trading, migration/remittances, coffee trading, trading in livestock, trading in other commodities, petty trading and any other activity which are undertaken by households as their secondary job besides their primary activity of agriculture. Likewise, those households who are not participating in non-farm activity are regarded as those households who are entirely depend on agriculture only.

**Household:** In this study a household is a collection of individuals who work and live together to provide mutual care, including provision of food, shelter, clothing and health care as well as socialization.

## **Chapter Three: Methodology**

### **3.1. Description of the Study Area**

#### **3.1.1. Geographic Location and Topography of the Study Area**

Daro Lebu district is located in Western Hararghe Administrative region at about 443 km South East of Addis Ababa. The capital town of the district, Mechara, is located at 08° 35.589' North and 40° 19.114' East. The District shares boundary with Boke and Habro District in the East, Arsi Zone in the South, Anchar District in the North and Bale zone in the West. Currently the district constitutes 40 PAs. The Daro Lebu woreda is situated between 7°52'10" and 8°42'30" north and between 40°23'57" and 41°9'14" east. The large mass of the woreda is below 1700 masl which extend down to below 800 in the valleys of the rivers that bordered the woreda. The altitude ranges from as low as 1350 masl up to 2450 masl. Daro Lebu district is characterized mostly by flat and to some extent by undulating land features.

#### **3.1.2. Agro-ecology and Climatic Condition**

Daro Lebu woreda is generally divided in to three agro ecologies: the lowland (Gammojii), the midland (Badda Daree) and the highland (Baddaa) constituting 44, 44, and 12% of the total area of the district respectively. Generally there are two rainy seasons: Arfasa (March-April/May) and Hagaya/Gana (July-September/October). The annual rainfall of the woreda is rages from 600mm-1200mm. Along with this, the temperature of the district is ranges from 14 to 26 degree Celsius with average of 16 degree Celsius of temperature. As far as the type of soil is concerned, loam, clay and sandy soil are the three dominant soil types in the district.

#### **3.1.3. Population and Demographic Characteristics**

According to CSA (2008), the population of Daro Lebu woreda is 198, 918 of which 8.5 of them are urban dwellers while the rest 91.5% of them are rural population. Similarly around 102,014 populations were male while 96,904 were female.

#### **3.1.4. Social Services and Infrastructural Development**

Daro Lebu woreda is one of the underdeveloped woreda in terms of social and infrastructural development. With regard to educational services, data from woreda educational bureau shows that, there are 52 elementary and two secondary schools in the woreda. When we see the number of students who are enrolled in different educational level the data shows that, there are 34,134

students who are currently enrolled in primary education in the woreda. Similarly the number of students who are currently enrolled in grade 9 and 10 are 1,220. Whereas the number students who are currently enrolled in preparatory (grade 11 and 12) education were 388. A great difference was observed between male and female with regard to participation in different educational level. As it was clearly shown in the table below, male accounts for 56.6 and 64.2% of the total elementary and grade 9 and 10 students, while female comprise 43.4 and 35.8% respectively. Furthermore, the proportions of female students who are enrolled in preparatory education are too small (13.9%) when compared with male students (86.1). As educational level increase, the proportion of female students enrollment are decreased when compared with male students and the vice versa is true. This shows that, there is a high rate of dropout among female students in the study area.

**Table 2: Students enrollment in different educational level**

Educational level	Total	Male	%Total	Female	% of total
1-8	34,134	19,321	56.6	14,813	43.4
9-10	1,220	783	64.2	437	35.8
11-12	388	334	86.1	54	13.9
1-12	35,743	20,439	57.2	15,304	42.8

**Source: Woreda Educational Bureau (2011)**

**Health Services:** as far as health services are concerned the data from health bureau of the woreda shows that, there are 34 health posts, 4 health center and there is only 1 clinic in the district. There are 2 health extension workers in each PAs. The interview with the head of woreda health bureau shows that, there is about 90% of health coverage in the woreda. Malaria, anemia, diarrhea, respiratory disease, fight injury, intestinal parasite, gastric, unknown febrile illness, eye disease and malnutrition are the ten top diseases which causes mortality in the woreda. Previously malaria was the main disease which causes mortality in the area but now the rank was overtook by fight injury and other respiratory disease.

**Road and Electric Services:** The main town of the woreda Mechara and Micheta town has electric light services while the rest 38 PAs have no electric light. Along with this, the woreda has internal dry season road coverage and external outlet to Bale, Cancho, Addis Ababa and Dire-dawa. But internal road particularly rural roads are seasonal in character as it can give services only during dry season. Due to the gravel nature of the road and lack of proper maintenance, high tariff costs and shortage of transportation facility are observed in the area.

### 3.1.5. Land and Land Use Pattern

Land resources are one of the productive resources of households in the study area. Data from woreda agricultural and rural development office shows that, from the total land of the woreda 189,821 hectares of land are suitable for cultivation purposes of which only 40260 hectares has been cultivated currently. Land occupied by social services, forest and pasture in the woreda are 6442, 3700 and 135,138 hectares respectively.

**Table 3: Land use patterns of Daro Lebu Woreda**

Land type	Size in hectares	Percentage
Cultivated land	40,260	9.3
Grazing land	135,138	31.1
Forest land	3,700	0.85
Bush land	31,967	7.36
Cultivable potential	149,561	34.43
Social services	6,442	1.48
Useless(stony) land	67,212	15.48
TOTAL	434,280	100

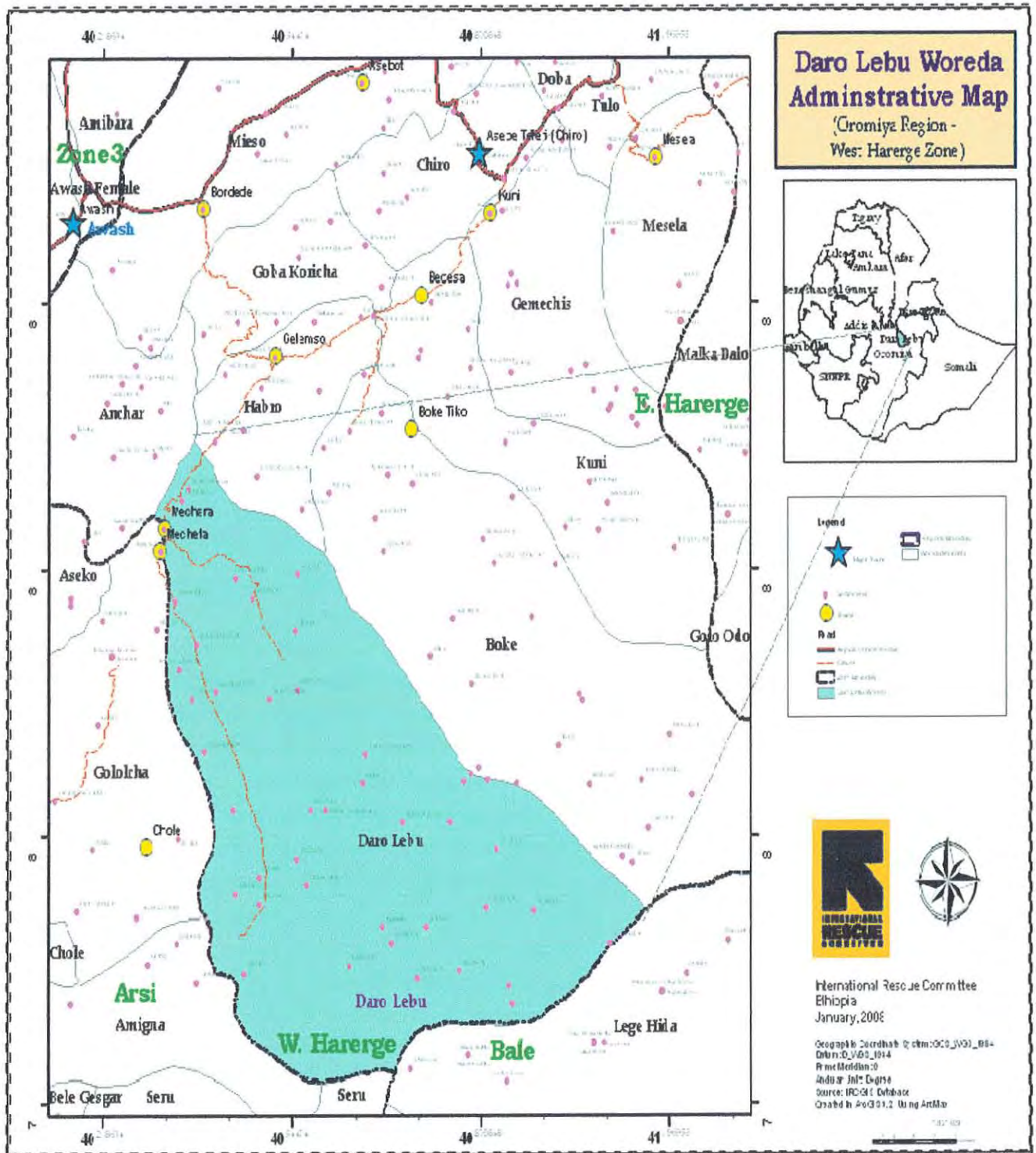
Source: Woreda Agriculture and Rural Development Office, 2011

### 3.1.6. Major Economic Activities in the Study Area

Mixed agriculture which are characterized by crop production and livestock husbandry, is the main predominant economic activity and the major source of livelihood in the study area. The agriculture is predominantly rain-fed. The principal food crops grown in the area are sorghum, maize, teff, wheat, barley, beans, sesame and some vegetables and fruits were also grown mainly in highland area of the district. Sorghum and maize are the two major food crops which are predominantly grown in the area. While coffee, chat and groundnut are the major cash-generating crops grown in the area (Woreda Agriculture and Rural Development Office, 2011).

Livestock husbandry as an integral component of mixed agriculture is also one of important livelihood resources particularly in lowland areas of the district. Cattle, goats, sheep, donkey, camel and poultry are from among the major type of livestock reared in the study area. The contribution of crop production and livestock sub-sector to household food security are deteriorated overtime in the context of small land holding and adverse environmental problem that are observed in the study area. Due to this, households could not able to support their livelihood by engaging themselves on risky agricultural activity alone. Hence most of households have been forced to involve in different livelihood activity to sustain their live. Petty trade, chat trading, coffee trading, wage labour, and trade in live stock are the major nonfarm activities in the area.

Figure 2: Location Map of Daro Lebu Woreda



Source: International Rescue Committee (2008) cited in Adane (2008).

### **3.2. Study Design**

This particular research was conducted in West Hararghe zone of Oromia region. The reason why Daro Lebu woreda was selected by the researcher is that, first, the woreda is one of the drought-prone and food insecure woreda in west Hararghe; secondly, in terms of the research on livelihood, food security and others research Daro Lebu woreda is one of the marginalized woreda in Oromia in general and in west Hararghe in particular.

In the selection of Kebele's from the woreda and respondents from the kebele multi-stage sampling was used. The first step was the selection of 3 kebele from the woreda. Basically there are three agro-ecological zones in Daro Lebu woreda and these are: Highland (which constitute 11 kebele), Midland (which constitute 26) and Lowland (which constitute 8 kebele). The reason for the classification of the woreda based on their agro-ecological zone is to get the most representative data for the woreda. Households in one agro-ecological zone are assumed to be homogenous. Once the kebeles are stratified based on their agro-ecological zone, then 1 kebele's from each agro-ecological region; Chaffe hara, Sororo and Gadulo from highland, midland and lowland respectively were selected randomly by the researcher. Having selecting kebeles from each agro-ecological zone, the sampling frame was made available from the respective kebele manager. Then the sampling frame in each kebele was stratified in to male headed and female headed households and finally a simple random sampling technique was used to select a sample of 120 households of which 75% are from male-headed and 25% are from female-headed households.

### **3.3. Methods of data collection**

#### **3.3.1. Data Sources**

To conduct this particular research both primary and secondary sources were used. Secondary sources were gathered from different journals, articles, books, GO, NGO reports working in the area, and rural and agricultural development offices of the woreda. Primary data was collected from households, Key informants, Kebele administrators, DAs, and rural and agricultural development experts in the woreda.

Different methods such as structured household survey, Key informant interview, focus group discussion, case studies, and observation were used to collect primary data. Interview was also

conducted with experts who are working as foci person of food security and drought prevention and preparedness commission in the woreda.

#### **3.3.1.1. Structured household survey**

Household survey was prepared for all of the sampled households. By using the structured household survey different type of information was gathered from households such as information on the demography, food security situation, household livelihood asset status, participation in non-farm activity and diversification strategy of the households. Furthermore, Household survey was used as an important means of generating quantitative data.

#### **3.3.1.2. Key Informant Interview (KII) and Focus Group Discussion (FGD)**

Key informant interview was conducted in each kebeles with DAs, kebele administrators, elderly, and community leaders to get important information on the livelihood of the population, the non-farm activity in the area, the vulnerability of the population, food security situation, and determinants of food security in the area. KII was conducted with 2 elderly people, 1DA and kebele manager in each kebele.

Similarly Focus group discussion was conducted in each kebele. The FGD constitutes 3 households from each male headed and female headed HH's, 2 elderly, religious leaders, 2 DAs, and teachers. The focus group discussion was help to generate in-depth information regarding household access to livelihood resources and constraints, and economic, political, and socio-cultural information of the households on the area, participation in non-farm activity and food security situation. Key informant interview and focus group discussion was used as a means of triangulating information which is generated by the structured household survey. Furthermore KII and FGD were used as instrument of wealth ranking practices in that while undertaking the focus group discussion, the participants was classified in to two groups by the researchers. Then each group was given the list of name of sampled households and were asked to classify the household wealth status in the area in to three categories, i.e., rich, medium and poor. Finally they were asked the criteria of classification.

### 3.3.1.3. Observation

Observation was used as a supplementary means of generating information. While undertaking the fieldwork, the researcher was come across the livelihood base of the households, physical environment, diversification strategy pursued by the households, socio-cultural practices etc. this was also help to triangulate the information which is derived by other instruments.

### 3.3.1.4. Case Studies

Case studies were conducted with one respondent in each kebele. This helped to get deep information which would not be gained through other instruments.

## 3.4. Method of Data Analysis

The analysis of qualitative data was done during and immediately after the data collection. Quantitative data was coded and analyzed by using different statistical techniques such as, percentage, frequencies correlation, regression and chi-square test. In the analysis of quantitative data different models was used. The multi-variant regression model was used to see the statistical relationship between dependent variable (the food available for the households in the last 12 months converted in to kilocalories) and the independent variable such as age of household head (HHH), sex of HHH, family size, land size, educational attainment of HHH, livestock ownership in tropical livestock unit (TLU), oxen ownership, participation in non-farm activity (NFA), access to credit and fertilizer use.

On the other hand, a logit model has been employed to see the relation between livelihood diversification and its determinants. Logit is a probability regression model, the application of which is recommended when the dependent variable is binary and assumes a value of 0 and 1. There are occasions where regressands or dependent variable can be qualitative or dummy, mostly in situation where the dependent variables are yes or no type. For instance, the decision of worker to participate in labour force, the decision to participate is yes or no types. Therefore, in that situation other regression model such as OLS method is not appropriate and the most relevant method that are suited for such situation is logit and probit model (Gujarati, 2004). However there is no compelling reason to choose one over the other. In practice many researchers choose the logit model because of its comparative and mathematical simplicity.

Following Gujarati (2004), the logistic probability function for household's participation in nonfarm activity can be defined as:

$$P_i = \frac{1}{1 + e^{-Z_i}} \quad (1)$$

For ease of exposition, we write equation 1 as;

$$P_i = \frac{1}{1 + e^{-Z_i}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad (2)$$

As it was shown above if  $P_i$  is the household probability of participating in nonfarm activity (equ 1&2) and the probability of households will not participated in nonfarm activity ( $1 - P_i$ ) is given below:

$$1 - P_i = \frac{1}{1 + e^{Z_i}} \quad (3)$$

Therefore, following Gujarati (2004) ,  $\left(\frac{P_i}{1 - P_i}\right) = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i} \dots \dots \dots (4)$

Where  $Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_m X_{im}$

Hence,  $\frac{P_i}{1 - P_i}$  is the odds ratio in favor of participation in nonfarm activity. It is the ratio of a probability that a household will participate in nonfarm activity to probability that a households will not participate in nonfarm activity. Taking the natural logarithms of the odds ratio of equation (4) we will result in what is known as the logit model as indicated below.

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_m X_{im} \quad (5)$$

Where  $P_i$  is a probability of being participating in nonfarm activity ranges from 0 to 1

$Z_i$  = is a function of m explanatory variables (x)

$\beta_0$  is the intercept

$\beta_1, \beta_2 \dots \beta_m$  are the slope of the equation

$L_i$  is the log of the odds ratio, is not only linear in X, but also linear in the parameters' and is called the logit.

By including the disturbance (error) term the logit model is as follows:

$$Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_m X_{im} + u_i$$

## Description of Variable

### Dependent Variable

The dependent variable of the binary logistic analysis has dichotomous nature representing whether the households are participating in nonfarm activity or not. The variable assumes the value of 1 if the households are participated in nonfarm activity and 0 otherwise.

**Table 4: Explanatory variables used in logit model**

<b>Variables code</b>	<b>definitions</b>
<b>Sex of household head</b>	A dummy variable which takes value 1 if household head is female and 0 if household head are male)
<b>Age of household</b>	A continuous variable which takes the value of (1, 2, 3...)
<b>Land size:</b>	Size of own arable land in hectares, takes the value of ( 1, 2, 3, ...)
<b>Family size:</b>	Total size of household member takes the value of (1, 2, 3....)
<b>Livestock ownership:</b>	Size of livestock owned by the households in tropical livestock unit (TLU)
<b>Access to Credit:</b>	Access to credit is a dummy variable which takes a value of 1 if the HHs have access to credit and 0 otherwise)
<b>Educational status:</b>	Educational status of households is a dummy variable ( 0,1,2 and 3 if households are illiterate, read and write, primary and secondary respectively).
<b>Agro-ecologies:</b>	Agro-ecologies of the households which takes a value of 1 if households are from highland, 2 from midland and 3 from lowland)
<b>Ox-Ownership</b>	Size of oxen owned by the households and takes the value of (1, 2, 3...).

## Chapter Four

### 4. Demographic and Socio-economic characteristics of households in the study area.

This chapter reports the findings of the study. The chapter is divided into two main sections. The first section presents demographic variables of the households such as age, sex and family size and their relationships with household's participation in nonfarm activity. The second section deals with socio-economic characteristics of the household. In the second section the various livelihood resources of the households and the relationship between household's livelihood resource endowments and participation in nonfarm activity has been presented and discussed

#### 4.1. Demographic Characteristics and Participation in Nonfarm Activities.

The demographic and socio-economic characteristics of the sampled households have been discussed here. As it was discussed in the methodology part, the total numbers of female headed households included in the study are 30 which are 25% of the sampled households and 10 households in each kebele; while the numbers of male-headed households are 90 (75%). The result of the study reveals that from the total households 84.2% of them are married, while 13.3% of them are widowed. On the other hand from the sampled households there are insignificant numbers of the respondents (1.75% and 0.8%) who are divorced and unmarried respectively.

**Table 5: Sex, age and marital status of households across PAs**

Sex of HHH		Name of peasant association			Total
		Chaffee hara	Sororo	Gadulo	
	Male (%)	25.0%	25.0%	25.0%	75.0%
	Female (%)	8.3%	8.3%	8.3%	25.0%
	Total (%)	33.3%	33.3%	33.3%	100.0%
Age of HHH	<30 (%)	2.5%	7.5%	6.7%	16.7%
	30-45 (%)	21.7%	24.2%	25.0%	70.8%
	>45 (%)	9.2%	1.7%	1.7%	12.5%
	Total (%)	33.3%	33.3%	33.3%	100.0%
Marital status of HHH	Married (%)	27.5%	29.2%	27.5%	84.2%
	Divorced (%)		1.7%		1.7%
	Widowed (%)	5.0%	2.5%	5.8%	13.3%
	Unmarried (%)	.8%			.8%
	Total (%)	33.3%	33.3%	33.3%	100.0%

Source: field survey, (2010)

As far as the age category of the respondents are concerned, 16.7% of the total households are below 30 years of age and the large percentage of the households are between 30 and 45 years of age while the respondents above 45 years are accounts for only 12.5% of the total households.

#### 4.1.1. Age of household head and participation in nonfarm activity

Most of the study such as Degefa (2002), shows that, the more the households are aged enough, the more the chance of becoming food secure with the assumption that the more the households are matured, the more they have an experience in farming and agricultural related activity. Similarly, age of households also have an impact on livelihood diversification.

This study revealed that, there is a positive relationship between participation in nonfarm activity and age of the household heads. As it can be portrayed in table below, it was only 40% of households who are headed by people under 30 years of age were participated in nonfarm activity, while 60% of households headed by people between 30-45 age category and >45 age were participated in nonfarm activity. This shows that households who are headed by older people were more likely to be participated in nonfarm activity than households headed by younger people though the relationship between the two variables is not statistically significant.

**Table 6: Participation in nonfarm activity and age of households**

Age of HHs scaled	Participation in Nonfarm activity				Total
	No		Yes		
	Frequency	percentage	Frequency	Percentage	
<30	12	60	8	40	20(16.7)
from 30-45	34	40	51	60	85(70.8)
>45	6	40	9	60	15(12.5)
Total	52	43.3	68	56.7	120(100)
$\chi^2$ -value	2.715				
Df	2				
Sig.	0.257				

Figure in parenthesis shows % of households within each age categories.

Source: Field Survey, December, 2010.

#### 4.1.2. Sex of Household Head and Participation in Nonfarm Activity

Sex of the household head has a significant impact on household's ability of participation in livelihood diversification. Households who are headed by men are most of the time more likely to be participated in nonfarm activity than households headed by women. Great differences were observed in the study area with regard to participation in nonfarm activity as far as sex of the household head was concerned. The result of the study reveals that, 63.3% of male headed

households were participated in nonfarm activity while only 36.7% of female headed households were participated in nonfarm activity. Male headed households were found to be more likely to be participated in nonfarm activity than female headed ones. The Pearson chi-square test shows that, the association between participation in nonfarm activity and sex of household head was statistically significant at  $P < 0.05\%$ .

**Table 7: Participation in nonfarm activity and sex of household head**

	Participation in Nonfarm activity				Total
	No		Yes		
	Frequency	percentage	Frequency	Percentage	
Sex of households Male	33	36.7	57	63.3	90(75)
Female	19	63.3	11	36.7	30(25)
Total	52	43.3	68	56.7	120(100)
X2-value	6.516				
Df	1				
Sig.	0.011				

Figure in parenthesis shows % of households within each sex categories

Source: Field Survey, December 2010.

#### 4.1.3. Family Size of the Households and participation in nonfarm activity

Family size is one of the demographic characteristics of the households which affect diversification of livelihood activities pursued by the households. The study reveals that it is only 36.7% of the households who had a family size of less than or equal to 5. On the other hand, 49.2% of the households had between 5 to 8 family size, while 14.2% of the households had a family size of  $>8$ . There is a difference among agro-ecologies in the study area as far as family size was concerned. The study reveals that 27.5%, 35% and 36% of the households in Chaffee hara, Gadulo and Sororo had a family size of less than or equal to 5. On the contrary the largest percentage of households who had a family size of  $>8$  were observed in Chaffee hara and followed by Gadulo.

There is also a difference in family size among the sex of the households. The study reveals that 46.7% of female headed households had a family size of less than or equal to 5, while it is only 33.3% for male headed counterparts.

**Table 8: Households family size across sex and agro-ecologies**

Name of peasant association			Family size			Total(n=120)
			Less than or equal to 5	From 5 to 8	>8	
Chaffee hara	Sex of HHH	Male	23.3%(7)	46.7%(14)	30%(9)	30
		Female	40%(4)	50%(5)	10%(1)	10
	Total	27.5%(11)	47.5%(19)	25%(10)	40	
Sororo	Sex of HHH	Male	53.3%(16)	43.3%(13)	3.3%(1)	30
		Female	30%(3)	60%(6)	10%(1)	10
	Total	47.5%(19)	47.5%(19)	5%(2)	40	
Gadulo	Sex of HHH	Male	23.3%(7)	60%(18)	16.7%(5)	30
		Female	70%(7)	30%(3)	0(0)%	10
	Total	35%(14)	52.5%(21)	12.5%(5)	40	
Total	Male	33.3%(30)	50%(45)	16.7%(15)	90	
	Female	46.7%(14)	46.7%(14)	6.7%(2)	30	
			36.7%(44)	49.2%(59)	14.2%(17)	100%(120)

Figure in parenthesis shows frequency of households

Source: Field Survey, December, 2010.

As it was mentioned above family size was also one of the determinant factors which have a significant impact on household's participation in diverse livelihood activities. Most study such as Davis et al (2007) indicates that households who have large family size were more likely to be participated in nonfarm activity than households with limited labour. The larger the family size, the better the households participation in diversification of livelihood activities as there can be more option of allocating labour force in to on-farm, off-farm and nonfarm activity. As it is clearly indicated in the table 10, only 40.9% of households who have a family size of less than or equal to 5 were participated in nonfarm activity. On the other hand 62.7% and 76.5% of households who had a family size of (5.1 to 8) and >8 were participated in nonfarm activity. The study shows that, as the family size of the households increases, household's participation rate in nonfarm activity were also increase. Similarly the Pearson chi-square test shows that, the association between households participation in nonfarm activity and family size is statistically significant at  $P < 0.05$ .

**Table 9: Participation in Nonfarm activity and Family size**

		Participation in Nonfarm activity				Total
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Family size	From 0 to 5	26	21.7(59.1)	18	15(40.9)	36.7(100)
	5.1 to 8	22	18.3(37.3)	37	30.8(62.7)	49.2(100)
	>8	4	3.3(23.5)	13	10.8(76.5)	14.2(100)
Total		52	43.3	68	56.7	100
$\chi^2$ -value		8.042				
Df		2				
Sig.		0.018				

Figure outside and inside of the parenthesis shows percentage of total and percentage within each family size categories respectively.

Source: Field Survey, December 2010.

#### 4.1.4. Productive Labour Availability and Participation in Nonfarm Activity

Most researchers such as Davis et al (2007), note that, availability of labour is likely to influence the range and type of activities in which the household is involved. Likewise in the study area, the result reveals that participation in nonfarm activity was directly related with the productive labour resources of the households. It is only 45.8% of households who are owned less than or equal to 3 productive labour force were participated in nonfarm activity whereas 63.9% of households who were owned >3 productive labour force were participated in nonfarm activity. The Pearson chi-square test result shows that, the association between household productive labour availability and participation in nonfarm activity is statistically significant at  $P < 0.05$ .

**Table 10: Participation in Nonfarm activity and Productive Labour Availability.**

		Participation in Nonfarm activity				Total
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Productive labour	From 0 to 3	26	21.7(54.2)	22	18.3(45.8)	40(100)
	>3	26	21.7(36.1)	46	38.3(63.9)	60(100)
Total		52	43.3	68	56.7	100
$\chi^2$ -value		3.824				
Df		1				
Sig.		0.049				

Figure outside and inside of the parenthesis shows percentage of total and percentage within each family size categories respectively.

Source: Field Survey, December 2010.

## **4.2. Socio-economic Characteristics of the Households and Participation in Nonfarm Activity**

The household's livelihood resource endowment would have also an influence in diversification of livelihood activities. The five livelihood assets of the rural household's i.e. human, financial, natural, physical and social capital are a significant factor on household's diversification of livelihood activities. It was generally acknowledged that, household's access or constraints to the above each livelihood capital would have a significant impact not only on rural household's diversification of livelihood activities but also on the type of livelihood activities in which they are engaged. Therefore, in this section the various livelihood resources owned by the households and its relation with participation in nonfarm activity have been presented.

### **4.2.1. Human Capital Endowment and Participation in Nonfarm Activity**

Education as part of human capital is one of the livelihood asset of the population. Education and health have direct linkages to household livelihoods and food security. Health and education status are central for revealing the human capital situation, one of the assets influencing the livelihood activities and strategies (Degefa, 2005). When we come to the educational status of households 54.2% of the households in the study area were illiterate and the situation is worse for female headed households where almost three-fourth of them were illiterate. 10% of the total respondents were able to read and write. Similarly, 30.8% of respondents are attained primary school education while only about 5% of the total households were reached secondary education. This shows that there is a serious educational problem in the studied households which signifies the low human capital they possessed.

**Table 11: Educational level of households across sex and agro-ecology**

Name of Kebele		Educational level of household head				Total(n=120)
		illiterate	Read and write	Primary school	Secondary school	
Chaffee hara	Male	46.7% (14)	13.3%(4)	30%(9)	10%(3)	30
	Female	80% (8)	10%(1)	10%(1)	0%(0)	10
	Sub total	55% (22)	12.5%(5)	25%(10)	7.5%(3)	40
Sororo	Male	56.7%(17)	16.7%(5)	23.3%(7)	3.3%(1)	30
	Female	60%(6)	0%(0)	40%(4)	0%(0)	10
	Sub total	57.5%(23)	12.5%(5)	27.5%(11)	2.5%(1)	40
Gadulo	Male	40%(12)	3.3%(1)	50%(15)	6.7%(2)	30
	Female	80%(8)	10%(1)	10%(1)	0%(0)	10
	Sub total	50%(20)	5%(2)	40%(16)	5%(2)	40
Total	Male	47.8%(43)	11.1%(10)	34.4%(31)	6.7%(6)	100%(90)
	Female	73.3%(22)	6.7%(2)	20%(6)	0%(0)	100%(30)
		54.2%(65)	10%(12)	30.8%(37)	5%(6)	100%(120)

**Figure in parenthesis shows frequency of households**

**Source: Field Survey, December 2010.**

However, there is a difference in educational attainment across sex and agro-ecologies of the households. For instance 73.3% of the female headed households were illiterate, but only 47.8% of male-headed households were illiterate. Similarly the proportion of households who are attained secondary education were 6.7% of which male-headed households were accounts for 100%. This might have a negative implication on diversification of livelihood activities as there can be households who are deprived of educational resources have no equal opportunity to participate in nonfarm activity with educated households. There is a wealth of evidences that supports this statement. For instance, Ellis (2000), states that, poor educational attainment has been identified in empirical studies as a critical constraints inhibiting livelihood diversification.

The high illiteracy that was observed among the female headed households was due to the fact that the social and cultural back ground of the area may have influenced the involvement of female in education. The past cultural and social practice of the study area were not in favour of female participation in education rather it forces them to be married at their early age before they reach secondary education. Due to this there is a high dropout rate of female students in the area. This would have a significant impact on their future employment potential since they lack education which is one of the most important livelihood resources. Likewise, the difference in education was also observed across geographic region. For instance, the proportion of head of households who were reached secondary education was high for Chaffee-hara when compared to

Sororo and Gadulo. This is because of its proximity to the only secondary education school found in the center of the woreda Mechara town.

Education and skill are shown to be critical factors distinguishing the livelihood strategy option of the poor from the rural better off (Ellis, 2000). This shows that the educational achievements (human capital) which are an important variable that have direct impact on the livelihood activities are low in the study area particularly among female headed households which in turn would have a negative impact on the type of livelihood diversification strategy pursued by the households.

With regard to the relationship between educational attainment of households head and participation in nonfarm activity, there is a positive relationship between the two variables. As it is shown in the Table 13, 52.3% of illiterate households were participated in nonfarm activity while 50% of households who were able to read and write were participated in nonfarm activity. On the other hand those households who are attained primary education were more participated in nonfarm activity (67.6%) than illiterate households. however, those households who are attained secondary education were less participated in nonfarm activity (50%) than those who were attained primary education (67.6%) though the number of households who were attained secondary education are insignificant. Generally the study shows that, households who are better in educational achievement were more likely to be participated in nonfarm activity than illiterate households though the relationship between the two variables is statistically insignificant.

**Table 12: Participation in nonfarm activity and educational level of household head**

		Participation in Nonfarm activity				Total (%)
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Educational level	illiterate	31	47.7	34	52.3	65
	Read and write	6	50	6	50	12
	Primary	12	32.4	25	67.6	37
	Secondary	3	50	3	50	6
Total		52	43.3	68	56.7	120
$\chi^2$ -value						2.619
Df						3
Sig.						0.454

Source: Field Survey, December 2010.

#### **4.2.2. Social Capital of the Households**

Social capital refers to social resources involving networks, social claims, social relations, affiliations, and associations upon which people draw in pursuit of livelihoods (Degefa, 2005) was one of important livelihood resources that was observed in the study area. Social relationship that was based on either membership of that area or blood relation is the most observed features in the study area. People in that area are helping each other when one member of the community facing a problem such as health problem, death of animal and in situation where the food of households are run out before the harvest. For instance, the results of the focus group discussion and key informant in Chaffee-hara shows that, whenever the death of live-stock is happened to one household, each member of the community has the social responsibility to contribute some fixed amount of money, so that the livestock will be purchased and replaced for that households. In addition to the strong social tie that was observed in the study area, there are also social and community self-help mechanism such as Guza, Gumata and Gargarsa in the study area. Guza is the type of labour support on which the households requires the assistances of other households in a particular day to plough his farm. Gumata is the type of social self-support activities that is existed during wedding ceremony. If one of the community members get married, his relatives/friends invites the members of the community and each members of the community are expected to come up with some amount of money. Similarly, Gargarsa is also one of the social support activities that are observed in the study area. It is most of the time performed while risks related to economy happened to one members of the community. For instance, it is support in cash or in kind for households who face risks such as crop and livestock destruction due to risks related with crop pests, animal disease, and so forth.

#### **4.2.3. Financial Capital of the households and Participation in Nonfarm activity**

According to Carney (1998, cited in Degefa, 2005) financial capital refers to the financial resources available to people (whether savings, supplies of credit, or regular remittances or pensions) and which provide them with different livelihood options. Access to financial capital is the main determinants which affect the household decision of engaging in diversified livelihood activities. Due to this, poor households may face constraints to engage in non-farm activity particularly towards the activities which needs startup capital. The rich also have better

options to diversify their livelihood across non-farm ventures, since the start-up financial capital is not a big problem for them (Degefa, 2005). This study shows that the rich households were diversify their livelihood activity in highly profitable venture such as trade-in livestock, petty trade, and coffee trading, while the poor and destitute households are diversifying their livelihood activity in less profitable venture such as chat trading, daily labourers, and so forth. Here it is indispensable to discuss the wealth status of the households and its impact on diversification of livelihood activities due to the fact that those households who are better in wealth status were more likely to be participated in nonfarm activity than poor households.

**Wealth Status of Households:** during data collection the wealth ranking practices was done by researcher in all studied peasant association. The sampled households were classified according to their wealth status. Land size, livestock ownership, and land size utilized for cash crops were used as the main bench mark for classification of households in to different wealth group. Accordingly, the result of the study shows that, 12.5% of the studied households are rich, while the medium and poor constitute 45.8% and 41.7% respectively. From the sampled households the large numbers of poor are observed in Sororo and Gadulo which is around 47.5% and 42.5% of the sample households in each PAs. When compared with other two kebele small percentage of poor and the large percentage of rich households were observed in Chaffee hara.

**Table 13: Wealth status of households across different PAs**

Name of Kebele		Wealth status of the households			Total
		Poor	Medium	Rich	
chaffee hara	Male	10 (33.3%)	13 (43.3%)	7 (23.3%)	30
	Female	4 (40%)	5 (50%)	1 (10%)	10
	Sub total	14 (35%)	18 (45%)	8 (20%)	40
sororo	Male	16 (53.3%)	12 (40%)	2 (6.7%)	30
	Female	3 (30%)	7 (70%)	0 (0%)	10
	Sub total	19 (47.5%)	19 (47.5%)	2 (5%)	40
gadulo	Male	11 (36.7%)	15 (50%)	4 (13.3%)	30
	Female	6 (60%)	3 (30%)	1 (10%)	10
	Sub total	17 (42.5%)	18 (45%)	5 (12.5%)	40
Total	Male	37 (41.1%)	40 (44.4%)	13 (14.4%)	90
	Female	13 (43.3%)	15 (50%)	2 (6.7%)	30
		50 (41.7%)	55 (45.8%)	15 (12.5%)	120

**Note:** figure out-side the parenthesis shows number of households

**Source:** Field Survey, December 2010.

With regard to the relationship between wealth status of households and participation in nonfarm activity there is a positive relationship between the two variables. The study indicates that 80% of the households from the rich group were diversifying their livelihood activities; while 56.4% and 54% of the households from the medium and poor households were diversify their livelihood activities respectively. This indicates that households who are better in wealth status were more likely to be engaged in diverse livelihood activities than resource poor households. The chi-square tests shows that, the association between wealth and households nonfarm activity participation is significant at  $p < 0.1$ .

**Table 14: Household's wealth status and participation in nonfarm activity**

Wealth status	Participation in Nonfarm activity				Total
	No		Yes		
	Frequency	percentage	Frequency	Percentage	
poor	25	50	25	50	50
Medium	24	43.6	31	56.4	65
Rich	3	20	12	80	15
Total	52	43.3	68	56.7	120
$\chi^2$ -value	4.433				
Df	2				
Sig.	0.09				

**Source: Field Survey, December 2010.**

**Participation in Nonfarm Activity and Access to Credit:** constraints to credit services are one of the major factors which impede household's livelihood diversification which in turn would have a significant impact on food security. Most of researchers such as Barret et al, (2001), argue that, constraints to different types of credit services can impede diversification in to activities or assets characterized by substantial barriers to entry. Local level initiatives like microcredit or micro-enterprise development are designed to help people to create new forms of self-employment, or, at a larger scale, to start up businesses (Ellis, 2001). In conjunction with the above statement it is important to discuss household's access to credit services and its relation with households participation in nonfarm activity in the study area, due to the fact that those who have a better access to credit service have a good opportunity to diversify their livelihood activity than their counterparts.

The study reveals that from the total households only about 25.8% of them has access to credit. This shows that majority of the households have no access to credit services. 15% and 5% of households in Gadulo and Chaffee hara have access to credit services respectively. However,

57.7% of households in Sororo have access to credit which accounts for 74.2% of the total households who have an access to credit, where as Chaffee-hara and Gadulo accounts for only 19.35% and 6.5% of the total households who have an access to credit respectively.

**Table 15: Household access to credit across different agro-ecologies and sex of households**

Name of peasant association		Households access to Credit				Total(n=120)
		No		Yes		
		Frequency	Percentage	Frequency	Percentage	
Chaffee hara	Male	26	86.7	4	13.3	30
	Female	8	80	2	20	10
	Sub total	34	85	6	15	40
Sororo	Male	11	36.7	19	63.3	30
	Female	6	60	4	40	10
	Sub total	17	42.5	23	57.7	40
Gadulo	Male	29	96.7	1	3.3	30
	Female	9	90	1	2.5	10
	Sub total	38	95	2	5	40
Total	Male	66	73.3	24	26.7	90
	Female	23	76.7	7	23.3	30
		89	74.2	31	25.8	120

Source: Field Survey, December 2010.

The reason why Sororo households account for majority of the household who have access to credit is that, there is a formal credit and financial institution called Oromia Credit and Saving Institution(OCSI) operating in the area. The result of the interview with the expert of OCSI shows that from the sample kebeles they are working only in Sororo. They are working on some kebeles who have a better credit history and the maximum amount of the credit they are providing to the households is 2000 birr and the credit is given most of the time for female who are hard working. There is no collateral needed for receiving credit, but there is cross-liability among the recipients of the credit. The main purpose of the credit is to encourage women to participate in non-farm activity.

As far as the relationship between participation in nonfarm activity and household's access to credit was concerned, 53.9% of households who have no access to credit were participated in nonfarm activity, while 64.5% of households who had access to credit were participated in nonfarm activity. This shows that households who have better access to credit were more likely to be participated in nonfarm activity than their counterparts, however, the relationship between participation in nonfarm activity and household's access to credit is statistically insignificant.

**Table 16: Participation in nonfarm activity and household's access to credit**

	Participation in Nonfarm activity				Total(n)
	No		Yes		
	Frequency	percentage	Frequency	Percentage	
Access to Credit No	41	46.1	48	53.9	89
Yes	11	35.5	20	64.5	31
Total	52	43.3	68	56.7	120
X2		1.049			
Df		1			
Sig.		0.209			

Source: Field Survey, December, 2010.

#### 4.3.4. Natural Resources of the Households and Participation in Nonfarm Activity

Natural resources such as land, water, soil type, forests and the like, were the main natural capital that plays a crucial role for households of that area. Access or constraints to the above natural capital has a significant impact on the livelihood diversification strategy pursued by the households. From the natural capital of the households of the study area, here due emphasis was given only to the land resources of households, and this is due to the fact that, land is the most important resources for rural households.

**Land Resources of the Household:** Land holding size is one of the natural capitals of the households that determine the food availability (security) of the households. Under subsistence agriculture, land holding size is expected to play a significant role in influencing farm households' food security (Degefa, 2005). The land holding size was too small in Daro lebu woreda particularly in the highland and mid-land area. This is due to the high population density that was observed in the area. Accordingly, the study shows that the average land holding sizes per households under study area are 0.7 hectares which are too small to generate sufficient food even for the family of small size. Table (18) presents the land holding size categories in hectare and the proportion of people that fall under each category. The results of the study shows that 40% of the households were owned land which is less than 0.5 hectares and 49.2% of them were also owned from 0.51 to 1 hectares of land. The proportion of the households who had land holding size of less than or equal to 1 hectare is about 89.2%. This indicates the extent to which the land which is the main livelihood resources of the rural households is a serious problem in the study area.

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**Table 17: The proportion of households under different land size categories across agro-ecologies**

Agro-ecology		Land size in hectares				Total
		From 0 to 0.5	From 0.51 to 1 hectares	from 1.1 to 1.5 hectares	From 1.51 to 2 hectares	
Chaffee hara (HL)	Female	15(60)	10(40)	0(0)	-	25(100)
	Male	42.5(56.7)	27.5(36.7)	5(6.7)	-	75(100)
	Sub total	57.5%	37.5%	5%	-	100%
Sororo(ML)	Female	7.5(30%)	17.5(70%)	0(0)	-	25(100)
	Male	37.5(50)	35(46.7)	2.5(3.3)	-	75(100)
	Sub total	45%	52.5%	2.5%	-	100%
Gadulo(LL)	Female	5(20)	17.5(70)	2.5(10)	0(0)	25(100)
	Male	12.5(16.7)	40(53.3)	20(26.7)	2.5(3.3)	75(100)
	Sub total	17.5%	57.5%	22.5%	2.5%	100%
Total	Male	30.8(41.1)	34.2(45.6)	9.2(12.2)	0.8(1.1)	75(100)
	Female	9.2(36.7)	15(60)	0.8(3.3)	0(0)	25(100)
		40%	49.2%	10%	0.8%	100%

Figure out-sides and in-side the parenthesis shows % of total and % within sex of household head respectively.

Source: Field Survey, December 2010.

In the study area it is only 10.8% of the households who owns greater than 1 hectares of land. From the sample households no one have a land more than 2 hectares. The study reveals that there is a variation of farm land holding across agro-ecologies and sex of households. The proportion of households holding less than 0.5 hectares of land were 19.2% in Chaffee-hara, while the percentages are 15% and 5.8% in Sororo and Gadulo respectively. This shows that the land holding is serious problem in highland area than mid-land and lowland and the situation is better in lowland than mid-land..

The mean land holding by the study households were varying across geographic region. The mean land size owned by the households in the Chaffee hara (highland) is about 0.61hectares. On the other hand the mean land holding for Sororo (midland) and Gadulo (lowland) household was 0.62 and 0.93 hectares respectively. The study reveals that, the mean land holding is small in high-land areas (Chaffee hara) and on the contrary the mean land holding was better in lowlands (Gadulo).

**Table 18: Average land holding size of households in different Kebele**

Name of Kebele	Sex of HHH	Mean	Maximum	Minimum	Std. Deviation
Chaffee hara	Male	.64	1.375	0.25	.312
	Female	.54	0.875	0.25	.167
	Total	.61	1.375	0.25	.284
Sororo	Male	.62	1.25	0.375	.214
	Female	.65	0.875	0.375	.154
	Total	.62	1.25	0.375	.199
Gadulo	Male	.97	2	0.25	.421
	Female	.80	1.5	0.5	.284
	Total	.93	2	0.25	.395
Total	Male	.74	2	0.25	.364
	Female	.66	1.5	0.25	.230
	Total	.72	2	0.25	.336

Source: Field Survey, December 2010.

Despite the observed differences in mean land holding that are prevailed across agro-ecology in the study area, there is also a difference in mean land-holding between male-headed and female-headed households. The mean land size holding for female headed households were 0.66 hectares, while it is 0.74 hectares for male-headed households. This implies that, constraints to land holding is a major problem for female headed households than their counterparts.

Most of the time those households who have large land size were better in terms of the wealth status which would in turn have a positive impact on livelihood diversification. On the contrary different study also indicates that those households who were poor in terms of land resources were more likely to be participated in nonfarm activity as they were forced to participate in nonfarm activity because of the distress push factor which was reinforced by the small land holding size. When we see the existing reality that are prevailed in the study area 60.4% and 49.2% of households who had land holding size of less than or equal to 0.5 hectares and from 0.5 to 1 hectares were participated in nonfarm activity respectively. On the other hand 75% of households who had land holding size of 1.1 to 1.5 hectares were participated in nonfarm activity. This shows that there is positive relationship between land holding size and participation in nonfarm activity though the association between the two variables was statistically insignificant.

**Table 19: Participation in nonfarm activity and land holding size**

		Participation in Nonfarm activity				Total(n)
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Land size	From 0 to 0.5 hectares	19	39.6	29	60.4	48
	From 0.51 to 1hectare	30	50.8	29	49.2	59
	From 1.1 to 1.5 hectares	3	25	9	75	12
	>1.5 hectares	0	0	1	100	1
Total		52	43.3	68	56.7	120
X2		4.039				
Df		3				
Sig.		0.257				

Source: Field Survey, December 2010.

#### 4.3.5. Physical Capital of the Households and Participation in Nonfarm Activity

Physical capital comprises the basic infrastructure such as transport, shelter and irrigation works, as well as the production equipment which enable people to pursue their livelihoods (Scoones 1998 as cited in Degefa, 2005). Physical infrastructure such as road, transport facility, communication, irrigation facility and health infrastructure would negatively or positively affect the livelihood activities and food security situation of the households. For instance, good road infrastructure and availability of good transport facility shortens the distance and saves the times for households who are engaged in diverse livelihood activity. Furthermore, road infrastructure facilitates market and reduces marketing costs. On the other hand most of the time access to safe water has relieved households from water born disease.

As far as the situation in the study area is concerned there is road facility which cross all three kebele, but the problem was there is no good rural road infrastructural facility in rural area. The rural road which connects rural kebele's to small nearby towns are seasonal in character as it can give services only during dry season. The more the households are far from the main road, the more the difficulty for households to transport their products, particularly during the rainy season, due to the fact that there is no good rural roads which links rural kebele to small nearby towns. Regarding transportation facility in the area, 50.8% of the households reported that there is hard to get transportation facility; while 46.7% of households were reported that there is no problem of transportation facility in the area, while the rest of households states that there is high cost of tariffs.

**Water and Irrigation Facility:** water is one of natural capital that has a significant impact on the livelihood of the population. Regarding water resources in the study area, there are variations across agro-ecologies. There are some rivers in the woreda but most of them are not utilized. As far as water for drinking sources was concerned those who are close to the cities and those who are close to some nearby towns has the chance of getting pure water. But as the distance of the household's residence increases from the market, there is high problem to drinking water and most of them were forced to drink water from ponds and wells.

The results of observation shows that, except Mechara town (the center of the woreda), all rural areas including some town in the woreda were not have access to potable water. The result indicates that, potable water is transported from Mechara town and sold to most part of the woreda during dry season. Furthermore, selling water is the livelihood activities to some households particularly during dry season. 25 liters of waters are sold in about 20 birr in many rural areas of the woreda. This indicates the extent to which water is a serious problem in the study area particularly during dry season.

When we come to the irrigation use of the households there are no irrigation facility in Sororo and Gadulo. From the sampled kebeles only households in Chaffee Hara were benefited from irrigation facility. The study reveals that most of the households in Chaffe Hara were used irrigation for the production of cash crops such as chat and coffee. The source of water for irrigation is spring and river.

**Households Oxen Ownership:** Oxen are one of the physical capitals of rural households since it is one of the main farm implements used by rural households mainly in crop production. The study reveals that, 62.5% of households in the study area were own less than or equal to one oxen whereas the rest 37.5% of the households were owned >1 oxen. When we come to the relationship between household oxen ownership and participation in nonfarm activity, the study reveals that, only 50% of households who are owned less than or equal to 1 ox were participated in nonfarm activity. On the other hand, 66.7% of households who had owned greater than 1 ox were participated in nonfarm activity. The Pearson chi-square test result shows that, the association between household's ox ownership and participation in nonfarm activity is statistically significant.

**Table 20: Participation in nonfarm activity and oxen ownership**

		Participation in Nonfarm activity				Total(n)
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Ox ownership	Less than or equal to 1	37	49.3	38	50.7	75(62.5)
	>1	15	33.3	30	66.7	45(37.5)
Total		52	43.3	68	56.7	120(100)
X2		2.932				
Df		1				
Sig.		0.087				

Figure in parenthesis shows percentage of households within each ox ownership categories.  
Source: Field Survey, December 2010.

**Livestock Resource Ownership:** livestock ownership was also one of the determinant factors which would significantly influence household's participation in nonfarm activity. Households who are rich in terms of livestock ownerships were more likely to be participated in nonfarm activity than their counterparts. The study reveals that, 48.3% of households in the study area were owned <5 livestock resources measured in TLU (Tropical Livestock Unit), while 42.5% of them were owned between 5 and 10 TLU. Only 9.2% of households in the study area were owned greater than 10 TLU. With regard to the relationship between participation in nonfarm activity and livestock resource ownership, there is a positive relationship between the two variables. Those households who are better in terms of livestock resource ownership were found to be more likely to be engaged in livelihood diversification than households who are poor in livestock resource ownership. The Pearson chi-square test shows that, the association between livestock ownership and participation in nonfarm activity is statistically significant at  $P < 0.01$ .

**Table 21: Participation in nonfarm activity and household livestock resource ownership**

		Participation in Nonfarm activity				Total(n)
		No		Yes		
		Frequency	percentage	Frequency	Percentage	
Livestock in (TLU)	<5	27	46.6	31	53.4	58(48.3)
	5 to 10	25	49	26	51	51(42.5)
	>10	0	0	11	100	11(9.2)
Total		52	43.3	68	56.7	120(100)
X2		9.328				
Df		2				
Sig.		0.009				

Figure in parenthesis shows percentage of households within each livestock ownership categories.  
Source: Field Survey, December 2010.

## Chapter Five

### 5. Diversification of Livelihood Activities and Household Food Security Situation.

#### 5.1. Diversification of Livelihood Activities in the Study Area

Livelihood diversification is the engagement of the households in various portfolios of activities. Diversity of economic activities within a household enhances the resilience of hazard-prone livelihoods by spreading risk and increasing the options for substitution between diverse livelihood components (Ellis 2000 cited in Shakya, 2010). There are various diversified livelihood activities that are undertaken by the households in the study area. Besides engagement in agriculture, the households in the study area participate in non-farm activities such as wage labour, petty trading, chat trading, coffee trading, trade in livestock, trade in other commodities such as grain, pulses and migration. Most of the households in the study area have participated in non-farm activity either as a means of asset accumulation or as a strategy to mitigate risks. Participating in non-farm activity is one of the strategies followed by the households to mitigate risk and the impacts of drought particularly for Gadulo households where there is harsh environmental condition. The study shows that in the study area around 56.7% of the households were diversifying their livelihood activities through engaging in various livelihood activities. On the other hand 43.3% of the households were not participating in non-farm activity; it means that they entirely engaged on agriculture.

**Table 22: Participation in Nonfarm activity and sex of household head across agro-ecologies**

				Chaffee hara	Sororo	Gadulo	
Female	NFAP	No	Frequency	7	4	8	19
			%	23.3	13.3	26.7	63.3
	Yes	Frequency	3	6	2	11	
		%	10.0	20.0	6.7	36.7	
	Total	Frequency	10	10	10	30	
		%	33.3	33.3	33.3	100.0	
Male	NFAP	No	Frequency	14	11	8	33
			%	15.6	12.2	8.9	36.7
	Yes	Frequency	16	19	22	57	
		%	17.8	21.1	24.4	63.3	
	Total	Frequency	30	30	30	90	
		%	33.3	33.3	33.3	100.0	

Source: Field Survey, December 2010.

In the study area it was found that, the proportion of involvement in non-farm activity was higher for male headed households (63.3%) than female headed households (36.7). Likewise, there was a difference in participation of nonfarm activity among households across different agro-ecologies and this was shown by the fact that from the total households participating in nonfarm activity a lion-share which is about 40.1% of the households are accounted for Sororo households, while 31.1% and 27.8% of them are accounted for Gadulo and Chaffee-hara respectively. However, in terms of diversifying income sources, Gadulo rank first.

## **5.2. Household Constraints and Motives for Livelihood Diversification in the Study Area**

There are various factors which constrain rural household's choice of participation in diverse livelihood activities. This is also true in the study area as there can be heterogeneous constraints to households with regard to participation in non-farm activity. The study reveals that, lack of start-up capital was the main constraints for household engagement in diverse livelihood activities particularly for poor households. Entry constraints may limit the diversification that can be achieved, leaving only low return activities free to the poor (Dercon, 2002).

The study indicates that, lack of startup capital and absence of rural credit was the main constraint that hinders the households from participating in diverse livelihood activities. Around 61.5% of the respondents indicate lack of start-up capital and absence of rural credit as the main factor that restrain them to engage in non-farm activity. This is particularly true for poor households, due to the fact that, poor households are deprived of financial capital and even they don't have other capital such as livestock to liquidate. The poor are less diversified despite facing more serious consequences of bad income draws with limited insurance and credit market imperfections (Dercon, 2002). However, 22.7% of households mentioned shortage of labour force as the constraints to livelihood diversification. Those households who are labour poor have less chance to participate in diverse livelihood activities than their counterparts. The further discussion of labour, capital, and other constraints of household's engagement in diversified livelihood activity was shown empirically on the determinants of livelihood diversification part.

With regard to motive for livelihood diversification, there is push and pull factors that force household's to engage in nonfarm activity in the study area. Pull factor is those factors which provide good opportunity to the households to engage in non-farm activity. Households motive

to diversification was might be due to pull factors if the household's engagement in non-farm activity was due to the existence of new market opportunities, slack time availability, or accumulation of asset/capital. Most of the time diversification which results from such factors is highly remunerative, and it requires high startup capitals. When we come to the real situation of households in the study area, the sampled households who are engaged in nonfarm activity was asked regarding the main factor that forces them to diversify their livelihood activity. The result indicates that, it is only about 15% of the households who were forced to diversify because of the pull factors.

Push factors such as risks, drought, food shortage, agricultural yield reduction and resource degradation are the main factor that was observed in the study area in forcing households to engage in diverse livelihood activities, particularly for those segments of the households who are deprived of financial resources. Most of the time participation due to push factor is less remunerative and it requires low startup capital and little skill. The study which was conducted by Dercon and Krishnan (1996) cited in Dercon (2002) on Ethiopia and Tanzania regarding the constraints to enter in to nonfarm activities shows that, the poor typically enter into activities with low entry costs: firewood collection, charcoal production, collecting dung cakes, casual agricultural wage employment, etc. The results of the study shows that, about 85% of the households who were engaged in diverse livelihood activities are mainly due to distress-push factor of which around 53% of them are forced to participate in non-farm activity to overcome food shortage and the rest 32% are accounted for risk mitigation, drought, and other. No matter how, less remunerative the type of the activities on which most of the poor households were engaged on, the contribution of non-farm income to total household income and food security are significant to the households in the study area.

### ***The contribution of nonfarm activity to household food security.***

*I am kemiya Adullahi, and my husband name is Mamma Galma and we have a 4 family members and my husband age was 35 years. We have a serious land shortage problem which is only about 0.25 hectares of land, and we don't have an ox to plough the land. Since my husband have been faced a serious health problem for a long period of time we don't have any labour in our households to work on farms, hence we are forced to give our land in the form of share cropping to other farmers. The amounts of food that we obtain from our share-cropped lands are not enough to meet our annual food demand. As you observe the land shortage that we had, we don't have any chat and coffee to offset the shortage of our households food demand through income from the sale of chat and coffee. We don't have any financial capital to engage in other activities such as chat and coffee trading. To overcome the serious food shortage that we faced, I am currently engaged on the non-farm activity, i.e. collecting and selling fire wood. I collect a fire wood from the forest and sell it in the market three or four days in a week. Having engaging in such activities I can get an average monthly income of 250birr. Most of the incomes from such activities are expended to buy the food consumption item.*

Besides the contribution of the nonfarm income to household's food security, this case study shows that how resources particularly financial resource endowment determine the type of nonfarm activities the households are engaged on.

### **5.3. Households Livelihood Activity and Income Portfolio Analysis**

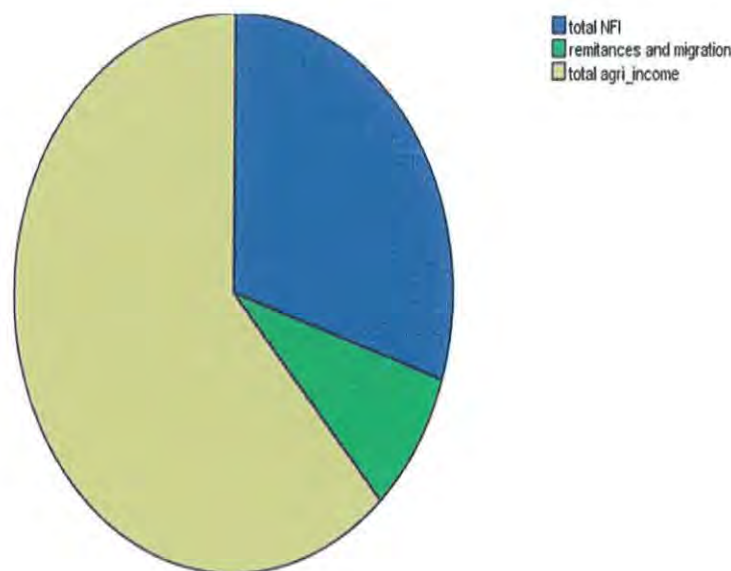
This section of the research deals with different livelihood income, which is generated by engaging in different diversified livelihood activities. The rural households who have an income from diverse portfolio of activities were better than those who are completely depend on agriculture. In line with this statement Shayka,(2010), argue that having several income opportunities that are all related to farming (e.g. own-account farming plus agricultural wage labor) is thus considered as more risky than having both farm and non-farm income sources within a household. He further argue that, harvest failure due to drought will affect all farm-related activities in a locality, while it is most likely not to have any impact on tourism-related activities or remittance income.

As far as the proportion of income of one activity from the total household's income was concerned, agriculture constitute the lion-share which is about 61.7% of the total household income. Despite shortage of rainfall and various risks associated with it, still agriculture had played a pivotal role in terms of its contribution to the total household income. But when we see the contribution and role of agriculture in safeguarding the food demand of the households, agriculture are unable to assure the household's annual food requirement. Because of this, most of households in the study area were faced a shortage of food supply and most of them were filled the food shortage by purchasing from market. Nonfarm income and income from cash crops, i.e. chat and coffee are play a significant role in this regard. The study result shows that, agriculture contributes a significant share of total household income and followed by the non-farm activity, which constitutes 30% of the total household income. However, income from migration and remittances constituted 8.26% of the total household income.

The below pie chart shows the percentage share of each activity to the total household income.

**Figure 3. Mean household Income portfolio**

- Agriculture constitute 61.73 % of total HHI
- Nonfarm Income constitute 30% of total HHI



With regard to the mean annual income of different activity, the study reveals that agriculture contributes an average of 5671 birr of income per households per year, while NFI and migration was contributes about 2756 birr and 758 birr per-household per annum respectively.

**Table 23: Mean household income port-folio of HHs**

Type of household head		Agri-Income	NFI	Remittances
Male headed	Mean	6072.36	2968.33	622.22
	Sum	546512	267150	56000
	% of Total Sum	80.3	80.8	61.5
Female headed	Mean	4467.67	2120.00	1166.67
	Sum	134030	63600	35000
	% of Total Sum	19.7	19.2	38.5
Total	Mean	5671.18	2756.25	758.33
	Sum	680542	330750	91000
	% of Total Sum	100.0	100.0	100.0
	Share-of-Total Income (%)	61.73	30	8.26

**Source: Field Survey, December 2010.**

The difference was observed in average income of different income portfolio between female headed and male headed households. As it is observed from the Table 23, the mean annual income from agriculture for male headed household was 6072 birr while it was 4467 birr for female headed households. Similarly there is also a difference among sex of households with regard to mean annual income from the non-farm activity. The study reveals that, the mean annual income from the non-farm activity for male headed households were 2968 birr per annum. About 80.8% of total nonfarm income is accounted for male headed households. However, the mean annual income from nonfarm activity for female headed households was 2120 birr per annum and which is only about 19.2 percents of the total nonfarm income. This indicates that, female headed households have low mean annual nonfarm income, which is mainly explained by the low nonfarm participation rate of female headed households and less remunerative nature of the ventures in which they are participated.

On the contrary, different study shows that, female headed households were better in terms of income from remittances than male headed households. For instance, Davis et al, (2007) note that, female headed households tend to be more likely to receive greater amounts of transfers than male headed households. Concomitantly, the study reveals that, in the study area the mean annual income from remittances and migration was high for female headed households (1166 birr per household per annum) than for male headed households (622 birr). This suggests that

spouse who migrate are likely to remit back to households, and that both private and public transfers are more likely to be targeted to households where the head of household does not live with the spouse (Davis et al, 2007).

In the study area from agricultural income, cash crops i.e. chat and coffee are the main agricultural product that significantly contributes to the total household income. Chat and coffee constitute 88.4% and 52.3% of the agricultural and total household income respectively (Table 24). This shows the extent to which the agricultural economies of the households under study are entirely based on the production and sell of cash crops. In line with the above statement the results of observation, key informant and focus group discussion shows that, most of the area of the study is covered by chat and coffee. Having the land constraints that are prevailed in the study area most of the households were not in a position to get sufficient food from their land. Most of them were forced to bridge food shortage by purchasing from market. Income from sell of cash crops and non-farm activity are the major source of income in this regard, particularly for land poor households.

**Table 24: Mean annual income share of cash crops from total agricultural income.**

Sex of household head		Total Agri-income	Coffee&Chat income
Male headed	Mean	6072.36	5312.22
	Sum	546512	478100
	% of Total Sum	80.3%	82.8%
Female headed	Mean	4467.67	3303.33
	Sum	134030	99100
	% of Total Sum	19.7%	17.2%
Total	Mean	5671.18	4810.00
	Sum	680542	577200
	% of Total Sum	100.0%	100.0%

Source: Field Survey, December 2010

#### 5.4. Livelihood Diversification Index.

To see the portion of households who were mostly engaged in diversification of livelihood activities the Livelihood Diversification Index was used. The index shows not only the diverse livelihood activity that the households undertake, but also the income proportion of each activity to the total household's income. Furthermore, it shows the segments of households who are mostly engaged in livelihood diversification. By doing so, attempt has been made to see whether there is a difference within sex, agro-ecologies and wealth status of households in relation to

household's participation in nonfarm activity. The variable associated with diversification can be constructed by the inverse Simpson index of diversity (Hill 1973 cited in Yanagida, 2008). The diversity was calculated as:

$$\text{Diversity index} = 1 / \sum_{i=1}^N x_i^2$$

Where:

$X_i$  = proportion of household income generated by activity  $i$  to the total income

$N$  = number of different income source

$$\sum_{i=1}^N X_i^2 = (F/T)^2 + (N/T)^2 + (R/T)^2$$

Where  $F$  = total income household  $i$  from agriculture

$R$  = total income of household  $i$  from remittances

$N$  = total income of household  $i$  from non-farm activity

$T$  = total household income

As it is shown in Table 25, the diversity index for households in the study area was calculated. Income from different agricultural and non-agricultural activities were aggregated in to three parts namely, farm, nonfarm and migration income and the index was calculated based on this aggregate level. The result of the study reveals that, the overall mean diversity indexes for the whole households under study are 1.53. However, the difference was observed between male headed households which have a mean diversity index of 1.57, and female headed households which have diversity index of 1.42. The greater the diversity index, the more they are likely to be better in terms of diversification of livelihood activities. As it is shown in Table 25, male headed households have more diversified livelihood activities than female headed ones.

**Table 25: Livelihood Diversity Index by sex, wealth and across agro-ecologies.**

Wealth status of HHS	Sex of household head	Mean Diversity index	N
Poor	Male headed	1.56	37
	Female headed	1.42	13
	Total	1.53	50
Medium	Male headed	1.53	40
	Female headed	1.48	15
	Total	1.52	55
Rich	Male headed	1.67	13
	Female headed	1.00	2
	Total	1.58	15
Sex of HHH	Male headed	1.57	90
	Female headed	1.42	30
Agro-ecology	Chaffee Hara	1.48	40
	Sororo	1.52	40
	Gadulo	1.61	40
	Total	1.53	120

**Source: Own computation from field Survey of December 2010.**

Differences were also observed both across wealth status of households and the geographic region. The study reveals that, the mean diversity index for poor households, medium and rich households were 1.53, 1.52 and 1.58 respectively. The difference was observed in household's involvement in diversification of livelihood activities between the poor and medium households on the one hand, and the rich households on the other. The poor and medium households were found to be less likely to be engaged on diverse livelihood activities than rich households. The better off households were more diversify their livelihood activities than other two counterparts. This finding is concurrent with Davis et al, (2007) finding. From the findings of different empirical research which was conducted in different countries, Davis et al (2007) note that, greater reliance on non-farm sources of income is associated with greater wealth.

High degrees of livelihood diversification that are observed among better off households in the study area are also related with the household's participation rate in nonfarm activity. The study shows that 80% of better off households diversify their livelihood activity. However, the participation rates in nonfarm activity among medium and poor wealth group households were 56% and 50% respectively. Entry into high return non-crop activities, such as cattle rearing or shop keeping, is restricted to richer households, presumably with access to capital (Dercon, 2002). Concurrent to this idea, in the study area the richer households were not only better in

terms of highly diversifying their livelihood activities but also they have a better chance to choose the type of livelihood activities in which they are engaged. It is known that better off households have a wider chance to participate in lucrative ventures which needs high startup capital. In tandem with this finding, Barret et al, (2001) note that, the wealthier households have greater freedom to choose among a wider range of options than do the poor. Many studies in rural Africa find positive association between non-farm diversification and household welfare (Ersado, 2006).

Poor households in the study area were constrained by lack of startup capital; hence they are forced to participate in activities which are less remunerative. Most of the poor households are resource poor; particularly financial resources and this is the main constraints of poor households for participating in nonfarm activity, particularly in lucrative venture, which needs high startup capital. In line with the above statement, the result of the focus group discussion and key informant interview shows that, most of the time, the poor households are forced to participate in diverse livelihood activities because of the push factors. They are participating in nonfarm activity either as a means of risk mitigation or as a means of securing their households consumption demands. But, in most cases they are engaged in the type of activity which is less remunerative.

Similarly, an effort has also been made to see the mean diversity index across agro-ecologies. The study reveals that, households in lowlands (Gadulo) have more diversified livelihood activities than households in Sororo (mid-land) which would in turn have more diversified livelihood activity than households in Chaffee hara (highland). Gadulo is one of the areas in the woreda which are mostly known by the problem of food insecurity. Due to this, the high diversification of livelihood activities that was observed among households in Gadulo (lowland) agro-ecologies was mainly related to the harsh environmental conditions that are prevailed in the area.

## **5.5. Determinants of Livelihood Diversification**

There are various factors which affect participation decision of households in non-farm activity. Here the relationship between household participation in diverse livelihood activity and the livelihood assets and other variables which affect participation of households in diverse livelihood activity was shown. The binary logit model was used to see household's participation

in nonfarm activities and the various independent variables which determine the household's participation decision to nonfarm activity. Before going to further discussion of the results of the model there are some conceptual issues regarding the dependent variable which needs clarification. In this study the dependent variable is participating/not-participating in non-farm activity. Participation in non-farm activity is defined in this study as the participation of households in any non-agricultural activity apart from crop production and livestock rearing. Such activity may include activities such as wage labour, chat trading, coffee trading, trading in livestock, trading in other commodities, petty trading and any other activity which are undertaken by households as their secondary job besides their primary activity of agriculture. Likewise, non-participation of the households in non-farm activity means that those households who are entirely depend on agriculture only.

Before using binary logit as a model of testing the determinants of household's participation in nonfarm activity, it is necessary to test the problem of multi co-linearity or association among the various independent variables. Following Gujarati (2004), Variance Inflation Factor (VIF) was used to see the degree of multi-co-linearity among the continuous explanatory variables. VIF shows how the variance of an estimator is inflated by the presence of multi co-linearity. As the extent of co-linearity increases, the variance of an estimator increases (Gujarati, 2004). According to Gujarati (2004), variable of inflated factor can be calculated as:

$$VIF(x_i) = \frac{1}{1 - R_i^2}$$

Where,  $R_i^2$  is the square of multiple correlation coefficients that results when one explanatory variable ( $X_i$ ) is regressed against all other explanatory variables. Once  $R^2$  values for each continuous variable were obtained through multi-variant regression model, VIF values can be computed using the above formula. If the value of VIF exceeds 10 the variable are said to be highly collinear. To avoid serious problem of multi-collinearity, it is quite important to exclude the variables with the VIF value exceeds 10. Accordingly from the 11 explanatory variable that are assumed to be included in the model two variable; total agricultural income and cash crop income are excluded from the model because of multi-collinearity problem. See the VIF result on annex part.

Similarly contingency coefficients were calculated to test the degree of association among dummy variables. Based on chi-square tests the contingency coefficients were calculated for

each dummy variable to test if there is any multi-collinearity problem. The values of contingency coefficients are between 0 and 1. When the value of contingency coefficients approaches 1, there is a high problem of multi-collinearity between the discrete variables. On the other hand the value zero indicates that there is no association between the variables. See the results of contingency coefficient for dummy variables in annex.

The results of binary logit model shows that, from the nine explanatory variables that are included in the model, six of them are found to be the main determinants of household's nonfarm activity participation.

**Table 26: Maximum Likelihood Estimates of the Binary Logit Model.**

	B	S.E.	Wald	Sig.	Exp(B)
Age of HHH	.312	.526	.353	.552	1.027
Sex of HHH	-1.075	.520	4.058	.039**	.341
Education	.451	.246	3.361	.067***	1.570
Land size	-.044	.100	.195	.658	.957
Access to credit	1.328	.543	5.977	.014**	3.772
Family size	.288	.138	4.334	.037*	1.334
Agro-ecology	.660	.328	4.058	.004*	1.935
Livestock in TLU	2.24	.104	4.622	.032**	1.251
Oxen ownership	-.230	3.08	0.558	.455	0.794
Constant	-3.763	1.808	4.332	.037	.023
Pearson- $\chi^2$ value		30.215*			
-2 Log Likelihood		134.000 <sup>a</sup>			
Correctly Predicted (%)		70%			

\*, \*\*, \*\*\* indicates significance level at <1%, <5% and 10% respectively.

**Source:** Own computation from field survey, data.

**Agro-ecology:** The model reveals that, agro ecology has positively coo-related with participation in non-farm ventures. As we move from highland to mid-land and from mid-land to lowland agro-ecology, the likelihood of being participating in nonfarm activity would increase. And these results are concurrent with the results which are obtained through diversity index. Being in lowland agro ecologies (Gadulo) would increase the likelihood of household participation in nonfarm activity by a factor of 1.93. This is mainly related with the adverse environmental problem that is observed in lowland areas. Gadulo area is one of the most food insecure areas in Daro Lebu woreda and it is also one of the areas which have low potential in cash crop

production. Barret and Reardon, (2000) note that given household copes with a drought or other harvest shortfall by, among other things, working off-farm and raising the cash to fill the food deficit. In line with the above statement, most of households in Gadulo are forced to participate in nonfarm activity to overcome the adverse impacts of drought and the resulting food insecurity problem that is observed in the area.

**Sex of household head:** With regard to the sex of households, as it is clearly shown on the Table 26, there is negative relationship between participation in nonfarm activity and sex of households and the relationship are significant at <5% level. This was also concurrent with the findings which are obtained through diversity index which indicates the high involvement of male headed households in nonfarm activity than the female headed ones. The result shows that being male headed households would increase the likelihood of participating in non-farm activity than being female headed households.

**Family size:** family size is also one of the major factors which determine household's participation decision in diverse livelihood activities. Those households who have a large family size have a better chance to participate in diverse livelihood ventures than a family of small size. The relationship between family size and participation in different livelihood activity is statistically significant at significance level of <0.05%. The research which was conducted by Davis et al (2007) in 16 Africa, Asia, Eastern Europe and Latin America countries, shows that rural households with greater labour endowments are expected to be pushed towards off-farm activities since on average they are likely to have higher labour to land ratios. He notes that, the more labour available to a household the more likely households are to participate in, and receive higher returns from, all activities, and particularly off farm activities. In conjunction with this idea, the result of the study shows that an addition of a one unit individual in households will increase the likelihood of household's participation in nonfarm activity by a factor of 1.3. Those households who have rich labour resources were found to be more likely to be participated in nonfarm activity than labour poor family. Because, households with large family size have a better chance to allocate their labour force in to different farm and nonfarm ventures. On the other hand, the relationship between the two variables might have another implication since in the study area the probability of becoming food insecure is high for family of large size. The positive relationship that was observed between livelihood diversification and family size might be due to the high

incidence of food insecurity that is observed among households with large family size. Hence, diversifications of livelihood activities are one of the strategies to mitigate the food insecurity problem which is armored by large family size.

**Access to Credit:** As far as the relationship between livelihood diversifications and household access to credit are concerned, the model reveals that there is strong positive relationship between nonfarm participation and access to credit. The relation between the two variables is statistically significant at 5% level. The probability of participating in nonfarm activity is high for households who have better access to credit. Those households who were better in access to credit were found to be more likely to have diverse livelihood activity than their counterparts. Having access to credit would increase the likelihood of participating in nonfarm activity by a factor of 3.77.

**Livestock Ownership:** There is also strong relationship in the study area between nonfarm participation and livestock ownership in TLU. Livestock ownership in TLU was found to be the main determinants of household's participation in non-farm activity. Those households who were better in livestock ownership were more likely to have a better chance to participate in non-farm activity. This is mainly due to the reality that, households who are better in livestock ownership were not constrained from nonfarm activity participation by lack of financial capital since they have the opportunity to liquidate livestock, whenever they want to participate in nonfarm activity.

**Educational level of households head:** Educational level of household head is also found to be one of the main factors which affect the household's participation in nonfarm activity. Different researchers such as Ellis (2000) note educational attainment as one of the critical factor which affects rural household's participation in nonfarm activity. Concurrently, the model reveals that, households who are better in educational attainment were found to be more likely to be participated in nonfarm activity than illiterate households. As it is clearly shown in Table 26, there is a positive relationship between educational attainment of the household head and participation in nonfarm activity. The relationship between the two variables is statistically significant at  $p < 0.1\%$ .

## 5.6. Household Food Security Situation

To see the food security situation of households of the study area the household food balance model was used. The amount of food available for food consumption in the last 12 months was quantified for each household and then converted to calories.

### Household food balance model

Modified form of the regional food balance model which was used by Degefa (1996, and 2002) was used to calculate the amount of food available for households in the last year. As it was used by Degefa (2002, 1996), the household food balance was calculated as:

$$N_{ij} = (P_{ij} + B_{ij} + F_{ij} + R_{ij}) - (H_{ij} + S_{ij} + M_{ij})$$

Where:  $N_{ij}$  is net food available for household  $i$  in year  $j$

$P_{ij}$  is total grain produced by the household  $i$  in year  $j$

$B_{ij}$  is the total grain purchased by the households  $i$  in year  $j$

$F_{ij}$  is total grain obtained through food for work by household  $i$  in year  $j$

$R_{ij}$  is total relief food received by household  $i$  in year  $j$

$H_{ij}$  is post-harvest losses to household  $i$  in year  $j$

$S_{ij}$  is total crop utilized for seed from the home by household  $i$  in year  $j$

$M_{ij}$  is the total marketed output by household  $i$  in year  $j$

Based on the above formula the food available for households in the last 12 months i.e. two harvesting season (starting from months on which the survey was conducted to the same month in last year) was calculated for each households. To arrive at daily per capita calorie, the amount of net food available for households are converted in to calories and then divided by adult equivalent. Conversion factors<sup>1</sup> were used to convert the amount of grain available in to kilocalories.

The results of the study shows that there is a serious food shortage and the resulting food insecurity problem in the study area and this was demonstrated by the 1889.04 mean daily per capita of food available, which is about 90% of the daily Minimum Recommendable Allowance (MRA). The study clearly shows that around 75% of households in the study were food insecure. Only 25% of the sampled households are able to meet the minimum recommendable allowances. See Table 27.

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<sup>1</sup> Source: Agren et al (1968), cited in Degefa (2002): 1 Kg of maize =4.03; 1 Kg of other cereals=3.78 Kilocalorie ; 1 Kg of legumes = 4.07 kilocalories and 1 Kg of oilseeds = 4.07 kilocalories.

**Table 27: Mean daily per capita calorie and % of MRA attained by households**

Agro-ecology	Sex	Mean	% of MRA of per capita calorie per day				Total
			<50% of MRA	From 50-80% of MRA	From 80-100% of MRA	>MRA	
Chaffee hara	Female %	1745.15	2.5(10%)	10(40%)	5(20%)	7.5(30%)	25(100%)
	Male %	1883.17	2.5(3.3%)	30(40%)	25(33.3%)	17.5(23.3%)	75(100%)
	Sub total	1848.66	5.0%	40.0%	30.0%	25.0%	100.0%
Sororo	Female%	1914.32	2.5(10%)	12.5(50%)	5.0(20%)	5.0(20%)	25(100%)
	Male%	1874.99	2.5(3.3%)	27.5(36.7%)	20(26.7%)	25(33.3%)	75(100%)
	Sub total	1884.82	5%	40%	25.0%	30.0%	100.0%
Gadulo	Female	1778.21	0(0.0%)	12.5(50%)	10(40%)	2.5(10%)	25(100%)
	Male	1985.46	2.5(3.3%)	25(33.3%)	30(40%)	17.5(23.3%)	75(100%)
	Sub total	1933.65	2.5%	37.5%	40%	20%	100%
Total	Male	1914.5	3.3(4.4)	26.7(35.6)	25(33.3)	20(26.7)	75(100%)
	Female	1812.5	1.7(6.7)	11.7(46.7)	6.7(26.7)	5(20)	25(100%)
		1889	5%	38.3%	31.7%	25%	100%

Figure inside and outside of the parenthesis shows % within sex of the households and % of total respectively.

Source: Field Survey, December 2010.

Table 27, shows that, the proportion of households who has the calorie intake of less than 50% of MRA was only 5%, while the proportion of households who had a daily per capita calorie of less than 80% of MRA is 43.3%, which indicates the serious food shortage problem in the study area. Only 25% of the households are able to get a daily per capita calorie intake of above MRA. The difference was observed in per-capita food availability across agro-ecologies. The asserts that, 2.5% of households in Gadulo have attained less than 50% of MRA, while 5% of households in Chaffee Hara and Sororo were attained less than 50% of MRA. On the other hand, 80% of households in Gadulo were food insecure which means they were unable to achieve a daily calorie requirement of 2100 calories. Whereas, 75% and 70% of households in Chaffe Hara and Sororo were unable to meet the daily minimum amount of food in calorie required for individual to sustain a healthy live.

However, there a difference in the study area with regard to mean daily per capita calorie among the sex of household head. The study reveals that, the overall mean daily per capita calorie for male headed household is 1914 calorie, while the mean daily per capita calories of food available for female headed household are 1812 calorie. This indicates that, female headed households were the main victims of food insecurity problem than their counterparts and this might be

explained by different factors such as deprivation of livelihood resources endowment and the less participation rate of female headed households in nonfarm activity when compared with male headed households.

### 5.6.1. Mean Daily Per-capita Calorie of Food Availability and Demographic Characteristics of the Households.

In this section the mean daily per capita calorie of food available for households and the various demographic characteristics such as age, sex and family size of the households have been discussed.

**Mean daily per-capita calorie and age of household head:** The study shows that, the amount of daily calorie intake available for households are different among the age categories of households head. Households headed by younger people were found to be more likely to be better in terms of per capita food availability as, family size which are the main factor that affect food security negatively in the study area are small for that respective households . The study asserts that, the mean daily per-capita calories of food available for households headed by younger people (less than 30 years) were greater than the daily minimum recommendable allowances. However, households headed by older people were found to be more likely to be food insecure than younger households. The mean daily per capita calories of food availability for households headed by older people (over 45 years) is 1699.92 calorie, which is by far lower than the amount of food available for households headed by younger people (2366 calorie).

**Table 28: Mean daily per capita calories of food availability and age of household head.**

age of HHs	Sex of HHs	Chaffee hara	Sororo	Gadulo	Total
Age of HHH <30	Male	3183.00	2075.53	2116.00	2285.25
	Female	-	4829.77	1824.87	2826.50
	Total	3183.00	2381.56	2043.21	2366.44
from 30-45	Male	1752.53	1750.80	1981.30	1833.12
	Female	1783.18	1698.71	1766.55	1748.01
	Total	1760.78	1736.43	1924.03	1810.09
>45	Male	1705.99	2878.54	1639.67	1800.52
	Female	1656.41	723.82	-	1423.26
	Total	1692.46	1801.18	1639.67	1699.92
Total	Male	1883.17	1874.99	1985.46	1914.54
	Female	1745.15	1914.32	1778.21	1812.56
	Total	1848.66	1884.82	1933.65	1889.04

Source: Field Survey, December 2010.

As it was clearly shown on the above table, the mean daily per capita calories of food intake available for households headed by older people (>45 years) for Chaffee Hara and Sororo households are 1692.46 and 1801.18 calorie respectively; while the figure is 1639.67 calorie for Gadulo households. The mean daily per capita calories available for households headed by older people (above 45 years) was 80.6% of the MRA in Chaffee Hara, and 85.8% of MRA in Sororo, whilst the figure is 78% of MRA for the Gadulo households. From this, we infer that, the mean daily per capita calories of food intake available for households is different across age group and the negative relationship was observed between the mean daily per capita calorie available for households and the age of households head in general. However, there is a difference in mean daily per capita calorie within age categories among the sex of households. For instance, the mean daily per capita calories of food available for female headed households under age of 30 is 2826 calorie which is by far greater than mean daily calorie for male headed households under that respective age categories (2285 calorie). Conversely, the mean daily per capita calories for female headed households headed by people between age categories of 35-45 years and >45 years is by far less than the mean daily per capita calorie available for male headed households of under that respective age group.

**Mean daily Per-capita calorie and sex of household head:** Sex of household head is one of the factors which have a significant impact on food security. In Ethiopia, it is apparent that the head of a household strongly influences the household's livelihood and food security (Degefa, 2002). In line with this, an attempt has been made to see whether there is a difference in mean daily per capita of food availability among the sex of the households in the study area. As it was clearly shown in the above Table 28, the mean daily per capita calories for male headed households are 1914 calorie, while the figure is 1812.56 calorie for female headed households. This implies that, female headed households were more likely to be food insecure than male headed households.

**Mean daily per-capita calorie and family size of households:** Family size is also one of the demographic characteristics of the households which have a significant impact on food security. Here the assumption is that, households who have a large family size were more likely to be food insecure than family of small size. The study affirms that, households with small family size were more likely to be food secure than a household with large family size. As it is shown in Table 29, the mean daily per-capita calorie for households with a family size of less than or equal to 5 are 2311.66 calorie which is greater than daily MRA (2100 cal). Conversely, the mean daily

per capita calorie for households with a family size categories of from 5 to 8 and >8 are 1683.47 and 1508.69 calorie respectively. The mean daily per capita calories for households with a family size of between 5 and 8 and > 8 is about 80% and 72% of MRA respectively. This shows that, there is a serious problem of food shortage among the households with large family size and negative relationship was observed in mean daily per capita calorie and family size of the household in the study area.

**Table29: Mean daily per capita calorie and family size.**

Family size		Sex of HHS	Chaffee hara	Sororo	Gadulo	Total
Family size of HHS	Less than or equal to 5	Male	2436.11	2108.06	2732.25	2330.25
		Female	2235.05	3328.01	1840.17	2271.81
		Total	2363.00	2300.68	2286.21	2311.66
From 5 to 8		Male	1756.36	1613.64	1847.30	1751.51
		Female	1434.07	1405.90	1633.65	1464.77
		Total	1671.55	1548.04	1816.78	1683.47
>8		Male	1650.35	1543.35	1437.33	1572.21
		Female	1340.89	723.82	-	1032.36
		Total	1619.40	1133.59	1437.33	1508.69
Total		Male	1883.17	1874.99	1985.46	1914.54
		Female	1745.15	1914.32	1778.21	1812.56
		Total	1848.66	1884.82	1933.65	1889.04

Source: Field Survey, December 2010.

#### 5.6.1.2. Mean Daily Per-capita Calorie and Socio-economic Characteristics of the Households.

Socio-economic characteristics such as educational attainment, wealth status, access to credit, land holding and livestock ownership would have a positive or negative impact on food security situation of the households. The relationship between mean daily per capita calorie of food and some of the various socio-economic characteristics of the households have been discussed below.

**Mean Daily Per capita Calorie and Educational Attainment of the Households:** here efforts have been made to compare the mean daily per capita calorie of food availability and the educational status of household heads. The results of the study show that, there is a direct positive relationship between the mean daily per capita calories of food availability and the educational status of household head. The mean daily per capita calorie of available food was higher for literate household heads than to those illiterate household heads and higher for those who attend primary schools than for those who attend literacy education.

**Table 30: Mean daily per capita calorie and educational level of HHHs across agro-ecologies**

Educational level of HHH	Sex of HHH	Chaffee hara	Sororo	Gadulo	Total
Illiterate	Male	1727.33	1739.56	1643.01	1708.63
	Female	1886.10	1466.40	1836.37	1753.55
	Total	1785.07	1668.30	1720.35	1723.84
Read and write	Male	1618.09	2165.08	1871.44	1916.92
	Female	1340.89	-	1411.97	1376.43
	Total	1562.65	2165.08	1641.71	1826.84
Primary school	Male	2009.01	1950.93	2244.83	2110.00
	Female	1021.74	2586.21	1679.21	2174.30
	Total	1910.28	2181.95	2209.48	2120.43
Secondary school	Male	2586.29	2195.16	2115.88	2376.30
	Female	-	-	-	-
	Total	2586.29	2195.16	2151.88	2376.30
Total	Male	1883.17	1874.99	1985.46	1914.54
	Female	1745.15	1914.32	1778.21	1812.56
	Total	1848.66	1884.82	1933.65	1889.04

**Source: Field Survey, December 2010.**

The above table clearly shows that, mean daily per capita calorie of available food for those households who attend secondary education was 2311.11 calorie which is higher from the other three (illiterate, read and write and primary) counterparts. The study reveals that the more educated the head households, the better the per capita food availability. This is due to the fact that, households who were headed by more educated head use new technology such as fertilizers and improved seeds and they might have a good opportunity and skill to participate in non-farm activity than others.

**Mean Daily Per-capita Calorie and Land Holding Size:** regarding food per capita availability and land holding size attempt has been made to see the relationship between them and the results of the study was contrary to the assumption and to the usual practice. The result revealed that, the mean daily per capita calorie of food available was high for those households who had less than 1 hectares of land than for those who had greater than 1 hectares of land. This is contradictory with the results of multi-variant regression model which shows the positive relationship between the two variables. This might be explained by different factors. Firstly, mean is a measure of central tendency which are highly affected by the two extreme points. Though those households who had small land holding were better in terms of mean daily per

capita calorie of food availability, high standard deviation was observed within households who had small land holding size. For instance, there are a standard deviation of 667.5 and 670 mean daily per capita calorie of food within each household who had less than 0.5 hectares and those who had a land holding size of 0.5 to 1 hectares respectively. On the other hand, there is a standard deviation 399 mean daily per capita calories within households who had a land holding size of between 1 to 1.5 hectares. Secondly, when see the results of multi variant regression, simply household land holding size in hectares were used in the model. But, here when we categorize households in to different land holding size, some of the important variables might be lost.

**Table 31: Mean per capita food availability and the land holding size in hectare**

	Less than or equal to 0.5 hectares	From(0.5-1hectares)	From(1.1-1.5 hectares)	From(1.51-2 hectares)
Chaffee hara	1896.45(23)	1798.06(15)	1678.57(2)	-
Sororo	1900.44(18)	1875.39(21)	1801.61(1)	-
Gadulo	1817.64(7)	1870.24(23)	1661.97(9)	6649(1)
Total	1886.45(48)	1853.72(59)	1676.37(12)	6649(1)

**Figure in parenthesis shows number of households**

**Source: Field Survey, December 2010.**

**Mean Daily Per-capita Calorie and Livestock Resource Ownership:** livestock ownership is one of the livelihood resources of the households which have an impact on household food security. Most of the study shows that, those households who are better in livestock ownership were more likely to be food secure than households with small amounts of livestock. For instance, the research which was conducted by Degefa (2002) in Oromia zone shows that, households that possessed a large number of livestock were found to be better in food security than households that possessed small amount of livestock. Concurrent with Degefa finding, in the study area, the mean daily per capita of food available for households are positively correlated with the amount of livestock possessed by the households. As it is clearly shown in Table 32, households who have possessed >10 livestock (TLU) were found to be better in terms of mean daily per capita calorie of food availability than those households who are owned less than 10 TLU. Similarly households who have possessed between 5 to 10 TLU were found to be better in food security than those who possessed less than 5 TLU.

**Table 32: Mean daily per capita calories and livestock ownership.**

Livestock ownership(TLU)	Name of Peasant association			Total
	Chaffee Hara	Sororo	Gadulo	
Less than 5	1917.66	1899.22	1777.61	1864.47
From 5 to 10	1708.57	1885.46	2045.05	1876.23
>10	2084.93	1543.35	2201.36	2078.03
<b>Total</b>	<b>1848.66</b>	<b>1884.82</b>	<b>1933.65</b>	<b>1889.04</b>

**Source: Field Survey, December 2010.**

**Mean daily per capita calories and access to credit services:** access to credit services is one of financial resources of the households which have a significant impact on household food security. Most of the time, households who have a better access to credit services were more likely to be better in terms of food security than others. The study revealed that, except in Gadulo, households who have an access to credit were found to be better in terms of mean daily per capita of food availability than households who have not a credit services. The mean daily per capita calorie of food availability for those households who have access to credit services for Sororo and Chaffee Hara household was greater than MRA.

**Table 33: Mean daily per capita calories for credit and fertilizer user and non-users**

Name of peasant association	Access to credit		Fertilizer use	
	Yes	No	Yes	No
Chaffee Hara	2178.22	1790.50	1841.31	1883.33
Sororo	2208.71	1446.62	1885.01	1881.28
Gadulo	1549.92	1953.85	2184.51	1594.26
<b>Total</b>	<b>2160.30</b>	<b>1794.56</b>	<b>1942.95</b>	<b>1694.16</b>

**Source: Field Survey, December 2010.**

Similarly attempt has been made to compare the mean daily per capita calorie of food availability with households who applied fertilizer inputs with those who did not. As it is clearly shown in Table 33, households who applied modern fertilizer were found to be better in terms of mean daily per capita calorie of food availability than households who did not. Except in Chaffee hara, households who applied modern fertilizer had better mean daily per capita calories of food availability than households who did not use.

**Mean daily per capita calorie and the wealth Status of households:** it was generally acknowledged that there are differences in daily per capita calories of food availability among the wealth status of the households. In the study area this was demonstrated by the finding that

the mean daily per capita calories of food available for poor households are 1900 calorie, while it was 2291 calorie for rich households. Those households who are rich in resources such as land, livestock and cash crops are in most cases better in terms of the daily per-capita calories intake, than resource poor households and this is because of many reason. Firstly since, rich households has hold large size of farm land, the amount of crop produced from their farm lands are most of the time enough to cover their annual food consumption demand. Secondly, even though the crop they produced from their farm lands are not enough to cover their annual food demand, they have a better option to bridge the food shortage by purchasing from market either through sell of livestock or through cash crop income. The situation is worse for resource poor households whose production from agricultural lands are not enough to meet their annual food consumption demand and who have no livestock and enough income from cash crops to fill their annual food consumption gap through purchasing from market in case when their annual crop production are not able to meet their annual dietary need.

However, the difference in mean daily per capita calories of food availability was also observed within the poor households who had diversified livelihood activity on the one hand and those who are entirely depend on agriculture on the other hand. The mean daily per capita calorie intake available for poor households who had a diverse livelihood income was better than those poor households who are entirely depend on agriculture. This shows, the significant role of nonfarm income for poor households in terms of its contribution to mean daily per capita calorie of food availability. This was affirmed by the survey result which indicates that, the mean daily per capita calorie of food available for poor households who have participated in nonfarm activity was 1986 calorie with a standard deviation of 500, while, the mean daily calorie for poor households who have not participated in nonfarm activity was 1818 calorie with a standard deviation of 750.



**Table 34: Wealth status of households and the daily per capita calories**

Name of peasant association	Wealth status of the households	Per capita calories
Chaffee hara	Poor	1987.83
	Medium	1737.04
	Rich	1856.25
	Total	1848.66
Sororo	Poor	1954.27
	Medium	1788.10
	Rich	2143.94
	Total	1884.82
Gadulo	Poor	1770.24
	Medium	1778.95
	Rich	3046.16
	Total	1933.65
Total	Poor	1901.10
	Medium	1768.39
	Rich	2291.24
	Total	1889.04

Source: Field Survey, December 2010.

#### 5.6.4. Determinants of Household Food security

Different study shows that there are several factors which determine household's food security. Age of household head, sex, education, fertilizer use, and participation in NFA are some among others. Statistical models were used to see the relation between the food security situation of the households and the various factors which influence food security of households. To understand the various factors which influence food security, the multi variant regression model was used. The model was used to see the relationship between daily per-capita calorie of food available for households and various explanatory variables which would have an impact on food availability.

##### Variables Definition

The variables that were used in the model are:

**Dependent Variable(Y):** the per-capita food available for each household estimated by household food balance model for the past 12 months (December 2009 to December 2010)

##### Independent Variables

X1= Sex of household head (1=male and 2=female)

X2= Educational attainment of HHH

X3= age of household head in years

X4=family size of the HHH

X5=total non-farm income earned by the households in the last 12 months

X6= fertilizer use by the households

X7=access to credit by the households in the last 12 months

X8= ownership of livestock capital by the households converted in to TLU

X9= the cultivated land (in hectares) owned by the HHs

X10= the wealth status of the households (1=poor 2= medium 3=rich)

X11= households access to remittances

X12= households income from chat and coffee

**Table 35: Multivariate regression model for testing the determinants of food security.**

Model		Un standardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	2438.961	488.259		4.995	.000
	Land size	84.609	21.712	.293	3.897	.000
	Sex of HHH	37.531	133.383	.021	.281	.779
	Age of HHH	2.532	8.460	.026	.299	.765
	Edu-level of HHH	68.404	59.309	.090	1.153	.251
	Family size	-270.970	36.289	-.708	-7.467	.000
	Remittances	56.572	156.009	.026	.363	.718
	Fertilizer use	-84.645	141.188	-.045	-.600	.550
	Access to credit	117.923	136.136	.067	.866	.388
	Livestock in TLU	7.606	16.354	.038	.465	.643
	NFAP	602.857	121.747	.386	4.952	.000
	Coffee&Chat income	.017	.010	.144	1.822	.071
	R	0.699				
	R <sup>2</sup>	0.488				
	Adjusted R	0.436				
	F Change	9.356				0.000

**Source: Own computation from field survey data.**

The statistical relationship between the daily per-capita food availability (in calories) of the households and various explanatory variables were depicted on the above table. As the results of

the multi-variant regression model shows more than 48.8% of the variation in food availability of the households was explained by the model (explanatory variable).

Among the explanatory variables participation in NFA, land size of the households, income from chat and coffee and access to credit was found to be the main factor which affects household food availability in a positive manner.

The model reveals that, there is a positive relationship between the land holding size and mean daily per capita calorie. The better the land holding size of the households, the better their food security situation. Those households who have a large land size were found to be more likely to be food secure than households who have a small land size.

Similarly, the study reveals that income from cash crops i.e. chat and coffee is one of the main determinant factors for mean daily per capita calorie. Those households who have better income from chat and coffee would have high chance to be food secure.

Educational attainment of household heads has also a positive impact on household's food security, though the relation is not as such significant. Those households who have educated head are better in food security than household with illiterate head.

On the other hand, family size was found to be the main determinants of food security which affect the daily mean per capita calorie negatively. Having large family size would significantly increase the likelihood of household's to be food insecure. Those households who had large family size were found to be more likely to be food insecure than households with small family size.

As far as the relationship between participation in non-farm activity and daily per capita food availability was concerned, there is positive and statistically significant relationship between the two variables. In the study area those households who are participated in nonfarm activity were more likely to be food secure than households who did not. With 99% confidence we can state that, there is a strong positive relationship between the food availability of households and participation in non-farm activity. The mean daily per capita calorie of food available for those households who are engaged in non-farm activity was by far higher than their counterparts. This is mainly because of the reality that, though home production is not enough to meet their annual consumption demands they have a better chance of bridging their annual consumption gap

through purchasing from market. Further discussion of the relationship between household food security and participation in non-farm activity has shown below

### **5.7. The Role of Livelihood Diversification in Promoting Food Security in the Study Area**

In the discussion that we had so far some of the insights regarding the link between livelihood diversification in terms of its contribution to the total household income across all the three peasant association had been seen. It is generally acknowledged that the ultimate objective of household engagement in diversified livelihood activity is achieving household's food security. Here, it is worth to discuss the extent to which the livelihood diversification would contribute to the household's food security in the study area. In the study area, what was produced by most of the households are not enough to cover their annual food demand and this is demonstrated by the 72.5% of the households. Only 27.5% of the households indicate that, their annual productions from their farm are enough to cover their annual food requirement. Hence, most of them are obliged to bridge their annual food demand gap through purchasing from market. The study shows that, 72.4% of the households who face deficiency was filled their annual food requirement by purchasing from market, while 18.4% of them fill their food gap through participating in safety net program. However, 6.9 and 2.3% of them are filled their annual food gap through borrowing from relatives and reduction of the amount of consumption during shortage month respectively. As it was discussed above from the households who face food deficit 72.4% of them are compensate their annual deficit through purchasing from market and income from non-farm activity was the main source of money in purchasing food from market for 56.2% of the households in the study area. While income from, cash crops i.e. chat and coffee and sell of livestock together constitute the second important sources of income for purchasing food from market to cover the food deficit for 40% of the households. This shows that, the income from diverse livelihood activity has played a significant role in contributing towards the households food supply.

### 5.7.1. Participation in Nonfarm Activity and Daily Per-capita Calories of Food Available for Households.

As it was outlined above, income from non-farm activity has played a great role in securing the households food availability. The study indicates that, there is a significant difference in mean daily per capita calories of food availability among households who were diversifying their livelihood activity and those who did not. The study shows that, the mean daily per capita calorie of food availability for households who were engaged in diversification of livelihood activity is 2055 calorie which is accounted for 97.85% of MRA. On the other hand the mean per capita food available for households who were not participated in non-farm activity was 1672.02 which are only about 79.6% of the MRA. This shows, the extent to which the income from non-farm activity was contributes to the household's food security.

**Table 36: The relationship between non-farm activity participation of households and the respective mean per capita calories available for households.**

NFAP	name of peasant association	Mean	% of MRA	N	Std. Deviation
No	Chaffee Hara	1783.22	84.9%	21	821.096
	Sororo	1413.66	67.3%	15	413.618
	Gadulo	1768.30	84.2%	16	312.978
	Total	1672.02	79.6%	52	606.463
Yes	Chaffee Hara	1920.99	91.47%	19	405.257
	Sororo	2167.52	103%	25	817.388
	Gadulo	2043.88	97.3%	24	1129.255
	Total	2055.00	97.85%	68	855.028
Total	Chaffee Hara	1848.66	88%	40	652.992
	Sororo	1884.82	89.7%	40	780.500
	Gadulo	1933.65	95%	40	899.121
	Total	1889.04	90%	120	778.176

Figure in parenthesis shows percentage of MRA.

Source: Field Survey, December 2010.

As it is observed in Table 36, the mean per capita calories available for households who have participated in nonfarm activity is high from their counterparts in each agro-ecology. For instance, the mean daily per capita calories available for those households who are not participated in non-farm activity in Chaffee Hara, Sororo and Gadulo were 1783.22, 1413.66 and 1768.3 calories respectively, which is by far lower than the mean daily per-capita calorie of food

availability for households who are participated in nonfarm activity which is 1920.99, 2167.5, and 2043 calorie for Chaffe Hara, Sororo, and Gadulo households respectively.

The difference in mean per capita food availability was also observed within the household who were not participating in non-farm activity. For instance, the mean daily per capita calorie of food available for households who were not participating in non-farm activity for Chaffee-Hara households was 1783.32 calories which is about 84.9% of the MRA. This is high when it is compared with Sororo households which accounts only for 67.3% of the MRA. This is due to the fact that, though they are not participate in non-farm activity , chat was play a lot in contributing to the food availability of households particularly for Chaffee Hara households since they use irrigation facility.

Here it is indispensable to see the strength of relationship between mean daily per capita calorie and household participation in nonfarm activity. To test the relationship between the two variables empirically, statistical tests such as chi-square tests and correlation tests were used. The results of the chi-square tests show that, statistically there strong relationship between household's food security and participation in nonfarm activity. The tests was used to see whether the mean daily per capita calories of food available for households is influenced by the households participation/non-participation in nonfarm activity and the relationship was statistically significant at a significance level of less than 5%. The results of the test shows that, it is unlikely that the two variables are independent of each other (nonfarm participation and per capita calorie) and we can conclude that there is strong positive relationship between per capita calorie of food available for households and participation in nonfarm activity in the study area. In the study area those households who were participated in non-farm activity were more likely to be better in terms of the food security situation than those who are entirely depend on agriculture. (See Table 37).

**Table 37: Chi-square tests of the relationship between household's nonfarm activity participation and daily Per capita calorie.**

Food in calories	Participation in Nonfarm activity				Total
	No		Yes		
	Frequency	percentage	frequency	percentage	
Less than or equal to 1700	31	25.83	24	20	55
>1700	21	17.5	44	36.67	65
total	52	43.3	68	56.67	120
X <sup>2</sup>	7.021				
df	1				
Significance	0.008				

**Source: Field Survey, December 2010.**

In addition to the chi-square tests correlation tests was also used to strength the conclusion regarding the relationship between household food availability and participation in non-farm activity in the study area. The result of the correlation tests shows that there is strong linear relationship between the two variables. If the correlation coefficient is >0.5 and if the significance level is <0.05, the association between that two variable are strong. In our case the correlation coefficient is 0.597 and the significance level is at 0.01 levels and this shows the strength of the relationship between the two variables. See table (21).

**Table 38: Statistical tests of the correlation between household food availability and participation in non-farm activity**

		Per capita calories	PNFA
Per capita calories	Pearson Correlation	1	.597**
	Sig. (2-tailed)		.000
	N	120	120
PNFA	Pearson Correlation	.597**	1
	Sig. (2-tailed)	.000	
	N	120	120

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Source: Field Survey, December 2010.**

## Chapter Six

### 6. Summary, Conclusion and Recommendations

#### 6.1. Summary and Conclusion

This study is targeted to see the ways and the extent to which household's diversification of livelihood activities would contribute to household's food security. To get a better understanding regarding this issues, both qualitative and quantitative techniques was employed. The household survey was used as a tool of investigating the various livelihood resources, diversification of livelihood activities pursued by the households and the food security situation of households.

Most households in the study area are poor in terms of ownership of livelihood resources which is the main resources that have a direct impact on household diversification of livelihood activity and food security. Education as one of important element of human capital in particular are very low in the study area, where almost half of household heads in the study area were illiterate and the number of household head who are attained secondary education are insignificant. The situations are worse for female headed households where almost no households headed by female are accounted for secondary education. This implies that, most of household heads in the study area have low human capital which has a detrimental impact on the type of livelihood activities in which they are engaged.

Land is also one of the major constraints to households in the study area, particularly to households in highland and mid-land agro-ecologies. Beside the above resources, the study area is also poor in terms of water resources. Most of the households particularly households in Gadulo and Sororo have no access to irrigation facility, moreover, they don't have an access to pure drinking water.

When we come to the food security situation of households, 75% of households in the study area were food insecure or they are unable to meet the daily calorie requirement of 2100 calorie. Only 25% of households are able to achieve greater than or equal to 2100 calorie. There is severe food shortage problem in the study area where, 43.3% of households in the study area were unable to meet at least 80% of minimum recommendable allowance (2100calories). However, there is a great difference with regard to daily per capita calorie between households who are engaged on

livelihood diversification and those who did not. The mean daily per capita calorie available for households who have diversified livelihood activity is 2055 calorie; while it is only 1672 calorie for households who are entirely depend on agriculture.

There is a great difference in daily per capita calorie between households who had diversified livelihood activity and those who did not. The mean daily per capita calorie available for households who were participated in nonfarm activity are by far greater than for those who did not participate in nonfarm activity in each agro-ecologies. Besides this, different statistical tests such as chi-square tests were used to see whether there is a difference in per-capita calorie between households who were participated in nonfarm activity and those who were entirely depend on agriculture. Correlation test was also used to see the relationship between daily per capita calorie and participation in NFA, and both tests reveal that, there is strong and positive relationship between the two variable

There are various determinants of food security in the study area. The results of the study reveals that family size of households, land size of the households, participation in NFA and income from chat and coffee are found to be the main determinants which are positively correlated with daily per capita calorie at a significance level of  $< 10\%$ . Similarly, access to credit and livestock ownership in TLU, was found to be the main factor which have a positive relationship with daily per capita calorie though the relationship is not statistically significant. On the other hand sex of household head, age, remittances and fertilizer use was found to be the explanatory variables which have a negative relationship with daily per capita calorie.

Demographic and socio-economic factors are directly or indirectly affect household's participation in diverse livelihood activity. Age of household head, sex, and family size are the major demographic characteristics of the households which have a significant impact on households ability of participating in diverse livelihood activity. Similarly, socio-economic characteristics of the households such as livestock ownership, access to credit, education and wealth status of households are identified as some of the major determinants of livelihood diversification.

There is a significant difference in livelihood resource endowment between male and female headed households which in turn affect the ability to enter in to diversified livelihood activities and thus, the extent and nature of food security. Constraints to livelihood resource endowment

have made female headed households in a disadvantaged position and, therefore, pursue different livelihood diversification strategies. As a result, most of female headed households were constrained from participation in diverse livelihood activity. Furthermore, they are forced to engage in less remunerative ventures.

The most important finding of the study is that, diversification of livelihood activities pursued by rural household is diverse among the different households and across agro-ecologies. The better off households had more diversified livelihood activities than medium and poor households. Because, better-off household's were not constrained from engaging in diverse livelihood activities by lack of start-up capital, which is the main constraints for most of households. There is also a difference among the wealth status of households with regard to the condition under which diversification choices are made. Whilst, the better-off households were engaged in livelihood diversification as a means of asset accumulation, most of poor households were diversify their livelihood activity because of distress push factors. Moreover, they are engaged in livelihood diversification as a means of coping with the problem of food deficiency, usually in less remunerative ventures. However, there is also a great difference in food security status among poor households who have diversified livelihood income and those who did not. The poor households who have diversified livelihood income were better in terms of food security than poor households who were entirely engaged in agriculture.

The livelihood diversification behavior pursued by household is different across agro-ecology. Households in lowland agro-ecologies have more diversified livelihood activity than households in mid-land which in turn diversify than households in highland. Because, lowland area in general and Gadulo area in particular are one of the areas which are most of the time hard hit by problem of food insecurity and drought and the high diversification of livelihood activities that was observed in that area implies the households response to risks associated with food insecurity .

## 6.2. Recommendation

- Dercon (2000) note that promoting diversification is not necessarily a solution, but finding ways of reducing entry constraints in to profitable low risk activities is crucial. In line with this idea, one of the major constraints to livelihood diversification, particularly for poor households in the study area is lack of startup capital. Hence the government has to facilitates mechanisms through which poor households can get free access to financial capital so that, the poor will have a wider chance to participate in highly remunerative activities.
- The study indicates that, access to credit services is one of the main determinants of livelihood diversification and food security. However, there is limited credit institution in the area. Thus, a formal credit services has to be established and some sort of intervention might be needed to remove entry barriers.
- Human capital is one of the determinant factors on the type of livelihood activities the households pursue. The study shows that, households in the study area are poor in terms of human capital such as education and skill and the problem is severe for female headed households where majority of them are illiterate. The government has to create awareness regarding the importance of skill and education in livelihood diversification and some sort of interventions might be needed in removing the cultural and traditional constraints which hinder female student's involvement particularly in secondary and higher education.
- Livelihood diversification strategy is diverse among the type and wealth status of households due to diversity in rural livelihood asset endowment. For instance, the diversification of livelihood activities in the study area is mainly correlated with sex, education, family size and wealth status of households. The female headed households, the poor, household with large family size, and households with illiterate head were more likely to be entirely engaged on agriculture and suffer the difficulties posed thereof. Thus, rather than designing untargeted and uniform intervention for rural development, future intervention designed to support female headed households, household with large family size and poor households must take in to account such household diversity .

- One of the major problems of rural households in the study area is lack of saving habits. Hence, some sort of training might be needed for households on the area of saving.
- The study reveals that, there is great differences in food security between households who have diversified livelihood activity and those who are entirely depend on agriculture. Hence, awareness creation activity regarding the role of diversification of livelihood activities in food security has to be undertaken. .

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## 7. APPENDICES

### 7.1. Appendix I. Tables

**Table 1: Conversion factor used to estimate Tropical Livestock unit**

Livestock Type	Tropical livestock Unit (TLU)
Calf	0.2
Heifer	0.75
Cows/Oxen	1.00
Horse/Mule	1.10
Donkey	0.7
Donkey (Young)	0.35
Sheep/Goat	0.13
Sheep/Goat (young)	0.06
Camel	1.25
Chickens	0.013

Source: Storck et al, (1991) cited in Mulu, (2008).

**Table 2: Conversion factor used to calculate adult equivalent (AE).**

Age categories (in Years)	Male	Female
Less than 10 years	0.6	0.6
10-13	0.9	0.8
14-16	1	0.75
17-50	1	0.75
Greater than 50	1	0.75

Stock et al, (1991) cited in Mulu, (2008)

**Table 3: Variable Inflation Factor (VIF) for the continuous explanatory variables**

	Tolerance	VIF
Age of HHH	0.711	1.41
Ox ownership	0.494	2.024
Family size	0.651	1.536
Land-size	0.892	1.121
Livestock in TLU	0.429	2.33
Coffee & chat income	0.064	15.625
Agri-income	0.064	15.625

**Table 4: Contingency Coefficient (CC) for dummy variables of multi Linear Regression**

Variables	Sex of HHH	Credit	Agro-ecology	Educational level
Sex of HHH	1	0.033	0.000	0.230
Access to Credit		1	0.361	0.044
Agro-ecology			1	0.188
Educational level				1

**Table 5: Household Well-Being Ranking Data in Chaffee hara (Dega)**

Well-Being Criteria	Rich(Tujjara)	Medium(Giddu-galeessa)	Poor (Dhabaa)
<b>Livestock No.</b> <ul style="list-style-type: none"> <li>• cattle including ox</li> <li>• sheep &amp; goats</li> <li>• donkeys</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 8-12 cattle</li> <li>• Own more than 10 goats and sheep</li> <li>• Own more than 1 donkey</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 3-8 cattle</li> <li>• Own 4 -10 goats and sheep</li> </ul>	<ul style="list-style-type: none"> <li>• Own one cow</li> <li>• Own one or zero ox</li> <li>• Own less than 4 goats and sheep</li> </ul>
<b>Food Security</b> <ul style="list-style-type: none"> <li>• months that own food supplies last</li> </ul>	8-12 months	5-8 months	3-5 months
<b>Land</b> <ul style="list-style-type: none"> <li>• Area in hectares.</li> </ul>	From 1- 0.75 hectares	0.75 – 0.5 hectares	Less than 0.5 hectares
<b>Cash crops</b> <ul style="list-style-type: none"> <li>• Income from cash crop</li> </ul>	<ul style="list-style-type: none"> <li>• Produce chat and coffee</li> <li>• Have got from 15000.00 to 30000 birr from cash crop per annum</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and chat</li> <li>• Get from 5000 – 15000 birr from cash crop per year</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and they can get less than 5000 birr from cash crops per year.</li> </ul>
<ul style="list-style-type: none"> <li>• Participation in Non farm activity</li> </ul>	Participate in highly remunerative ventures such as coffee , shop and livestock trading	Participate in coffee, chat trading and FFW.	Participate in FFW, PSNP, and daily wage labour.

**Table 6: Household Well-Being Ranking Data in Sororo (woina Dega)**

Well-Being Criteria	Rich(Tujjara)	Medium(Giddu-galeessa)	Poor (Dhabaa)
Livestock No. <ul style="list-style-type: none"> <li>• cattle including ox</li> <li>• sheep &amp; goats</li> <li>• donkeys</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 8-10 cattle</li> <li>• Own more from 8-10 goats and sheep</li> <li>• Own more than 1 donkey</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 5-8 cattle</li> <li>• Own from 4 to 8 goats and sheep</li> </ul>	<ul style="list-style-type: none"> <li>• Own one or two cattle</li> <li>• Own less than 4 goats and sheep</li> </ul>
Food Security <ul style="list-style-type: none"> <li>• months that own food supplies last</li> </ul>	9-12 months	6-8 months	4-5 months
Land <ul style="list-style-type: none"> <li>• Area in hectares.</li> </ul>	From 0.75 – 1 hectares	From 0.5 to 0.75 hectares	Less than 0.5 hectares
Cash crops <ul style="list-style-type: none"> <li>• Income from cash crop</li> </ul>	<ul style="list-style-type: none"> <li>• Produce chat and coffee</li> <li>• Have got from 10000 - 20000 birr from cash crop per annum</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and chat</li> <li>• Get from 5000 – 10000 birr from cash crop per year</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and they can get less than 5000 birr from cash crops per year.</li> </ul>
<ul style="list-style-type: none"> <li>• Participation in Non farm activity</li> </ul>	Participate in shop, Coffee and livestock trading	Engaged on chat and livestock trading.	Involve in FFW, chat trading and daily labour.

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**Table 7: Household Well-Being Ranking Data in Gadulo(Kola)**

Well-Being Criteria	Rich(Tujjara)	Medium(Giddu-galeessa)	Poor (Dhabaa)
<b>Livestock No.</b> <ul style="list-style-type: none"> <li>• cattle including ox</li> <li>• sheep &amp; goats</li> <li>• donkeys</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 10-15 cattle</li> <li>• Own more from 10-15 goats and sheep</li> <li>• Own more than 1 donkey</li> </ul>	<ul style="list-style-type: none"> <li>• Own from 5-10 cattle</li> <li>• Own from 5 to 10 goats and sheep</li> </ul>	<ul style="list-style-type: none"> <li>• Own one cow</li> <li>• Own one or two cattle</li> <li>• Own less than 5 goats and sheep</li> </ul>
<b>Food Security</b> <ul style="list-style-type: none"> <li>• months that own food supplies last</li> </ul>	8-12 months	5-7 months	3-5 months
<b>Land</b> <ul style="list-style-type: none"> <li>• Area in hectares.</li> </ul>	From 1- 2 hectares	From 0.75-1 hectares	from 0.5-0.75 hectares
<b>Cash crops</b> <ul style="list-style-type: none"> <li>• Income from cash crop</li> </ul>	<ul style="list-style-type: none"> <li>• Produce chat and coffee</li> <li>• Have got from 8000 to 15000 birr from cash crop per annum</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and chat</li> <li>• Get from 3000 – 8000 birr from cash crop per year</li> </ul>	<ul style="list-style-type: none"> <li>• Produce some amount of coffee and they can get less than 3000 birr from cash crops per year.</li> </ul>
<ul style="list-style-type: none"> <li>• Participation in Non farm activity</li> </ul>	Participate in shop and livestock trading	Participate in grain and livestock trading.	Participate in FFW and wage labour activity.

## 7.2. Appendix II. Questionnaire

### Interview Schedule for Household Survey

Serial Number \_\_\_\_\_ District name \_\_\_\_\_ Name of peasant association \_\_\_\_\_ Name of village \_\_\_\_\_ Interviewer Name \_\_\_\_\_

Date of Interview \_\_\_\_\_ Interviewee name \_\_\_\_\_

#### I. Demographic characteristics

- 1.1 Name of household head \_\_\_\_\_
- 1.2 Sex of household head 1= Male 0= Female
- 1.3 Age of household head in years \_\_\_\_\_
- 1.4 Type of household head 1= male- headed 0= female-headed
- 1.5 Education level of household headed (years of schooling)
- 1.6 Marital status: 1= Married 2=divorced 3= widowed 4= others
- 1.7 If married 1= monogamy 2=polygamy
- 1.8 ethnicity 1= Oromo 2=Amhara 3= others
- 1.9 How many members are there in your households? Male \_\_\_\_\_ Female \_\_\_\_\_
- 1.10. The roof of the house for the household is made up of? 1= grass/straw 2=iron 3= others

Please, provide additional information on your household members and their relation to the household (HH) as per the table below

S/No	Name of the member	Age	Sex	Relation-ship to the household	Educational level
1					
2					
3					
4					
5					
6					
7					
8					
<b>Codes : Relation ship to household</b> 01=Head 02= Wife 03= Son 04=Daughter 05=Others				<b>Codes: Educational Level</b> 0=illiterate      1=read and write 2=primary school    3=secondary school 4= higher education	

#### II. Household Resource Ownership

##### Land and Other Resource

1. Do you have a land for agricultural use? 1=Yes 2= No
2. If yes, how did you get access to it? 1) Through inheritance 2) through land redistribution 3) gift from relatives 4) through share cropping 5)Free access to some ones land 6)Rented
- 7) Others specify-----

3. What are the total sizes of the following land types that you own?

S/No	Types of land	Timad/Kindi	Hectar
1	Cultivated land		
2	Fallow land		
3	Grazing land		
4	Settlement land		
5	Forest land		
6	Others		

4. Do you give your land to someone in the form of share cropping, sell or renting in this year?

1= Yes 2= No

5. If your answer is yes why did you do this? (Multiple responses are possible)

- 1) Need of cash to buy food                      2) Lack of seed and fertilizer  
 3) Need of cash for family health care      4) Elderly and unable to operate  
 5) Having extra land                              6) others, specify \_\_\_\_\_

6. What was the trend of your household land holding size since the last two decades?

- 1) Increasing                      2) Decreasing                      3) No change

7. If decreasing/ increasing what was the reason? Specify \_\_\_\_\_

8. Do you use any irrigation? 1=yes 2=no

9. If yes what is the source of water for irrigation system? 1) Pond 2) Spring 3) both 4) others

10. If your answer for question No 8 is yes for what purpose did you use the irrigation scheme?

S/No	Types of crops	Size of the areas(Kindi)	Total production	
			consumption	Sale

11. How was the productivity of your land for the last 10 years?

- 1) Increased                      2) Decreased                      3) Unchanged

12) If it was decreased what was the reason?

S/No	Reason for productivity decrease	Rank
1	Soil erosion	
2	Crop pests	
3	Deforestation	
4	Poor farming system	
5	Shortage of rainfall	
6	Lack of input	
7	Others specify	

13. Which of the following land productivity practice do you carry out in order to maintain/increase the productivity of your farmlands?

S/No	Productivity practice	Yes	No
		1	2
1	Field rotation	1	2
2	Crop rotation	1	2
3	Animal manure	1	2
4	Chemical fertilizer	1	2
5	Inter-cropping	1	2
6	Others Specify	1	2

**Crop production and livestock: financial capital**

1. Would you tell me the amount of crops you have grown and the amount of income you have earned from the crop in the last twelve months?

Type of crop	Total harvest	Home consumed	Amount Sold	Net income	Total income
Maize					
Barley					
Wheat					
Teff					
Sorghum					
Horse bean					
Chick peas					
Others					

2. Would tell us about your perennial crops (chat, coffee, fruits, vegetables, etc.) and the income you earn from them in the last twelve months?

S/No	Type of crop	Amount	Monthly income	Annual income
1				
2				
3				
3				
4	1= chat 2=coffee 3=fruits and vegetables 4=others			

3. Do you have any kind of livestock? 1= Yes 2=No

4. Would you tell me the number of livestock resources you own?

Type	Number	Equivalent in cash
Cows		
Oxen		
Bulls		
Heifers		
Sheep		
Goats		
Horses		
Donkey		
Chickens		
Camels		
Calves		
Total		

5. Do you get an income from the sale of the products of livestock in the last twelve months? 1=Yes 2=No

6. If your answer is yes what is the total income that you get from the sale of the products of live stock in the last twelve months? \_\_\_\_\_

7. Which of the followings are the constraints to rearing livestock? (Multiple response are possible) 1) Shortage of grazing land 2) Lack of additional fodder 3) Disease prevalence 4) Insufficient veterinary services 5) Shortage of water 6) Attack by wildlife 7) Others, specify \_\_\_\_\_

### Social Capital, Networks and Informal and Formal Transfer

1. Do your community members support each other? 1=Yes 2=No
2. If your household had a problem and needed money or food urgently, would you be able to get it from people in your community or from relatives? (circle one) Yes =1 No= 2
3. If someone in your household fell ill or was injured, and you needed help with farming or other work, would you be able to get it from people in your community? or from relatives?  
Yes= 1, No=2
4. In the last 12 months (between now and the same month last year), has your household received any of the following types of assistance from anyone outside the household? Exclude food aid or other formal transfers. 1=Yes 2=No
5. If your answer is yes who gave you this help - a relative, friend or neighbour, or someone else? Where does the person live - in your community, or somewhere else? Please fill the following table.

Item	Yes	No	From whom?	Where does he live?
Cash gift	1	2	1 2 3 4	
Cash loan (no interest)	1	2	1 2 3 4	
Food or grain gift	1	2	1 2 3 4	
Grain loan (no interest)	1	2	1 2 3 4	
Seed gift	1	2	1 2 3 4	
Seed loan	1	2	1 2 3 4	
Free labour	1	2	1 2 3 4	
Free use of oxen or plough	1	2	1 2 3 4	
Free use of donkey/mule	1	2	1 2 3 4	
Horse	1	2	1 2 3 4	
Others	1	2	1 2 3 4	
			Codes: From whom? 1=son/daughter 2 = relative 3 = friend or neighbor 4 = trader 5 = other	

6. Has your household been receiving remittances? 1. Yes 2. No
7. In the last twelve months do you have received remittances or assistance outside your household member, would you tell us about the source, the relationship you have with the person/organization that remitted you, the average amount in cash or kind per annum, and the purpose for which you use (d) the remittance?

Source	Remitter	Amount per annum		Use of the remittance
		In cash	In kind	
1. in the same <i>woreda</i> from other kebele	1. father			1. for building a house 2. for purchasing ox 3. for buying food 4. for buying clothes 5. for purchasing farm implements 6. for purchasing inputs 7. for petty trading 8. others, specify
2. from another <i>woreda</i> in the same zone	2. mother			
3. from other zone	3. brother			
4. from abroad (specify country)	4. sister			
	5. child			
	6. grandchild			
	7. non-relative			
	8. organization (specify)			

8. In which of the following community-based organizations (CBO) do you participate?

Institution	Contribution per month		Benefit earned	
	Cash	In kind	Cash	In kind
1) Afooshaa				
2) Quubii				
3) -----				
4) -----				

9. Do you participate in the social support activities? 1. Yes 2. No

10. If yes, what are the social support activities your household engaged in?

1) Guuza (Daboo) 2) Gumata 3) Gargarsa 4) Others specify \_\_\_\_\_

11. In the last 12 months, has your household received assistance from government or humanitarian organizations?

Type of assistance received	Type	Amount		
Food for work				
Cash for work				
Credit/loan				
Chickens				
Livestock				
Free fertilizer				
Free food				
Free cash				
Others specify				

#### Physical capital and human capital

1. How far is your residence from the nearby towns?

2. Where do people from this village go to buy or sell farm products, livestock and other commodities?

Market	Use of market				Average travel time	
	Buy grain	Sell livestock	Buy livestock	Buy other commodity	By foot	By vehicle
A						
B						
C						
D						

3. How many kilometres your area are away from the centre?

4. How do you describe the type of road in your locality?

1) Gravel road 2) Asphalt road 3) Muddy road 4) Others specify \_\_\_\_\_

5. Would you tell me about the transportation facility in the area?

1) Very hard to get transport 2) there is no problem of transportation 3) others specify \_\_\_\_\_

6. How do you transport your product to the nearby market?

(1. On donkey back 2. On camel back, 4. Carry it yourself 4. By using public transportation

6. Others specify \_\_\_\_\_)

7. Do you think that the transportation problem affect your non-farm economic activity?

1= Yes 2= No

8. If yes how did affect?

- 1) Delay to reach on time
- 2) perishable goods might spoil before they reach market
- 3) Others specify \_\_\_\_\_

9. Is your household has access to health services? (1. Yes 2. No)

10. If yes to Question 9 how many hours you are walking to get health facilities?

1. Less than 1 hour
2. 1-2 hour
3. 2-3 hours
4. Others specify \_\_\_\_\_

11. What is the source of drinking water for your household? 1) River 2) protected spring

- 2) Unprotected spring
- 4) pond
- 5) wells
- 6) others specify \_\_\_\_\_

12. What is the source of drinking water for your cattle? 1) River 2) protected spring

- 3) Unprotected spring
- 4) pond
- 5) wells
- 6) others specify \_\_\_\_\_

13. Is there any education institution in your locality? 1=Yes 2= No

14. If your answer to question 13 is yes in how many hours walking distance is the education centre located? 1.

- Less than 1 hour
2. From 1-2 hour
3. From 2-3 hours
4. More than 3 hours
5. Others specify \_\_\_\_\_

15. Do you send your children to school? 1=Yes 2=No

16. If your answer to question 15 is No why?

1. They have to work in farm
2. Inaccessibility of school
3. lack of money to cover the educational expense
4. Others specify \_\_\_\_\_

#### Access to Finance

1. Are there financial institution in your locality? If yes what are these?

1. Formal
2. Informal
3. Both

2. If your answer above is both to which your household belongs?

1. Iqub
2. Borrowing from relatives
3. arata
4. idir
5. Formal credit and saving
6. others specify \_\_\_\_\_

3. Do you have access to credit? 1=Yes 2=No

4. If your answer is yes from which source did you get credit in the last 12 months, the amount you borrowed and the purpose for which you use the money? Please fill the following table.

Source of credit	Amount borrowed	Purpose to use the money
Family /relatives		1 2 3 4 5 6 7 8 9 10
Money lender		1 2 3 4 5 6 7 8 9 10
Traditional institution		1 2 3 4 5 6 7 8 9 10
Government institution		1 2 3 4 5 6 7 8 9 10
NGOs		1 2 3 4 5 6 7 8 9 10
Commercial banks		1 2 3 4 5 6 7 8 9 10
Others specify		1 2 3 4 5 6 7 8 9 10
		codes
		1=to buy food
		2. to buy cloth for family
		3buy other consumption item
		4. buy livestock
		5. to buy farming inputs
		6.capital to trading(to engage in non-farm activity)
		7. education
		8. health
		9. others specify

5. If your response is no, why? (1. I didn't want 2. Absence of lending institutions

3. High interest 4. Lack of collateral 5. Other (specify) \_\_\_\_\_)

**Institution and governance**

1. What are the services you have received from the government and other institution?

Benefit	Yes	No
	1	2
Have got land certificate	1	2
Have got rural road	1	2
Have got free agricultural input	1	2
Have got free food aid during food shortage	1	2
Have got free access to credit	1	2
Have got good assistance from DAs	1	2
Have got free access to clean water	1	2
Have got health service and rural schools	1	2
Others specify		

2. Is there any institutional and governance related problem in your area which affect your household engagement in diverse livelihood activity? 1=Yes 2=No

3. What is the institutional and governance related problem that affect your household engagement in diverse livelihood activity? Please specify \_\_\_\_\_

**Part V: Non-farm employment opportunities: financial capital**

1. Do any of your household members work in activities apart from crop production and livestock rearing?

1. Yes 2. No

2. If yes, would you tell us about the types of activities, persons engaged in, amount of income from the job, and the purpose for which you use (d) the money?

Activity	Who does the work	Estimated annual income	Time of activity(At what season)	Time spent on work per/month	Earning used for			
					1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	
1. Formal or salaried employment 2. Public works (EGS, FFW, CFW) 3. selling grass 4. selling crop residue 5. Chat trading 6. Petty trading 7. local agricultural labor within the woreda 8. local agricultural labour outside the woreda 9. selling charcoal 10. renting	1. head 2. spouse 3. child one 3. child two 4. hired worker or labourer	Birr		Days/hours	1. buy food 2. saving 3. build a house 4. purchase farm tools 5. buy clothes 6. purchase modern farm inputs 7. pay loan 8. petty trading 9. pay tax 10 others, specify			
	11. Trading in grain and pulses ,12.Trading in livestock 13.Trading in other commodities 14. Bee-keeping/ honey sales 15.Egg sales 15)Eucalyptus sales (poles for building) 16)Charcoal or fire wood sales 17)Grass or fodder sales 18)Sand or stone sales 19) Areki preparation and sales 20)Tejj preparation and sales 21)Other drink such as tella and shameta 22)Food and tea preparation and sales 23) Basket making 24)Spinning or Weaving cloth (cotton or wool) 25)Pottery 26)Black smithing 27) Carpentry/ house building 28)Water carrying 29)Hair dressing 30)Traditional healer 31)Traditional birth attendant 32)Share cropping out land 33)Renting out land 34) Renting out pack animal (Donkey /mules) 35)Renting out oxen 36)Money-lending 37 Others specify							

3. What were the constraints to expanding your household's non-farm ventures?

Activity		Constraints
Code	If no Code write the name of activity	01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
		01 02 03 04 05 06 07 08 09 10 11 12
Codes: Constraints 01 = absence of rural credit 02 = not enough customers / market 03 = not profitable enough 04 = women's work / men's work 05 = labour poor (can't work, or not enough workers in the household) 06 = poor infrastructure 07 = don't have skills or knowledge 08 = lack of startup capital 09 = don't have tools, equipment, buildings, etc. 10 = shortage of raw materials, etc. (natural resources) 11 = don't have animals 12 = others specify		

4. Which of the following conditions most influence your household to diversify livelihoods?

1. Weather fluctuation    2. Yield reduction    3. To overcome food shortage    4. Work opportunity    5. Resource degradation    6. Accumulation of asset    7. Drought    8. conflict    9. Death of family member  
 10. To mitigate risk  
 11. Others specify \_\_\_\_\_

5. What personal factor have you observed from your household to diversify livelihood?

1. High motivation    2. low motivation    3. willingness to respond to change  
 4. willingness to participate    5. Unwillingness to participate    6. Others specify \_\_\_\_\_

6. Are there human related determinant that have an effect to diversify livelihoods in your locality? 1= Yes  
 2=No

7. If your answer is Yes what are these factors?

1. Human health    2. Education status    3. Nutrition    4. knowledge and skill  
 5. Capacity to work    6. Capacity to adopt    7. Others specify \_\_\_\_\_

8. From the factor which is listed in Ques, No 7 which do you think is more influential to your household?

\_\_\_\_\_

## Food security

1. What are the grains you often utilize as a staple food/ give the rank?

Food groups	Response		The three most important give rank	
	Yes	No		
	1	0		
Cereals	1	0	First	
Roots/tubers	1	0		
Legumes	1	0		
Milk/milk products	1	0	Second	
Eggs	1	0		
Meat	1	0		
Fish/seafood	1	0		
Oil/fat	1	0		
Sugar/honey	1	0	Third	
Fruits	1	0		
Vegetables	1	0		
Other specify				

2. How many meals do your family eat per day?

3. What food stuffs do you often eat at different meal times?

1. Breakfast \_\_\_\_\_

2. Lunch \_\_\_\_\_

3. Dinner \_\_\_\_\_

4. What is the total demand of grains for your household consumption per month in quintals? \_\_\_\_\_

5. Do the grain you produce from your farm land satisfy your households food consumption demand? 1= yes (pass to question number 10) 2=No

6. if no how do you supplement it?

1. By purchasing from market

2. By borrowing from other farmers

3. By borrowing from ider

4. By requesting relief support

5. By reducing the amount of consumption during the shortage month

7. If you purchase from market what is the source of money?

1. Borrowing from other farmers 2. Borrowing from edir 3. selling livestock

4. Income from non-farm activity 5. Others specify \_\_\_\_\_

8. Does the income you earn from non-farm activities enable you to buy food for bridging the deficiency? 1. Yes 2. No

9. what are the reasons for lack of sufficient and viable income from non-farm activities to become food secure at household level? \_\_\_\_\_

10. According to your own perception, what is the food security status of your household?

1. Food secure 2. Food insecure 3. Varies from one year to another 4. do not know

11. What do you think the main reason for being food insecure? \_\_\_\_\_

12. During which season do you often face the shortage of food supply/

1. Before the harvest of belg crops
2. Before the harvest of meher crops
3. Before both belg and meher crop harvests
4. Most of the times of the year

13. Which of the following have been the most important causes for the failure of your home crop production to satisfy your households food consumption?( indicate the degree of the importance of each factor)

factors	Most important	Less important	Not important
Small size of farm land			
Production of crop only during meher season			
Low soil fertility			
Shortage of draft power			
Shportage of labour power			
Lack of cash to purchase sufficient modern farm inputs			
drought			
Excessive rain			
Others			

14. I would like to ask the amount of crops you have grown, the total grain purchased by your households, the grain obtained through FFW and relief, the total crop utilized for seed from the home and the total marketed output by your household in the last twelve months?

Type of crop	Total harvest	Home consumed	Amount purchased	Amount obtained by FFW and relief	Amount Sold	Total crop utilized for seed
Maize						
Barley						
Wheat						
Teff						
Sorghum						
Horse bean						
Chick peas						
Others						

**Agricultural Extension Services**

1. Is there development agent in your PAS? \_\_\_\_ 1) Yes 2) NO
2. If yes, how far is it from your house? \_\_\_\_ (Hours of walk?)
3. Has your household received any type of extension service from any government and Non-government organizations? \_\_\_\_ 1) Yes 2) No
4. For how long DA has visited your farm? \_\_\_\_ since last year.
5. 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
  - 2) To give advice on soil conservation 4) To collect taxes 5) To collect other debts
  - 6) Other (specify)
6. Have you participated in the agricultural extension package program? \_\_\_\_\_
  - 1) Yes 2) No
7. If yes for how long? \_\_\_\_\_

8. Is there extension service for women? \_\_ 1) Yes 2) No  
 9. What kind of services \_\_\_\_\_  
 10. Could your spouse get this service? \_\_ 1) Yes 2) No 3) What type

**VII. Migration**

1. Is there any member of the family who migrate to other area? 1. Yes 2. No  
 1. If yes would you tell me his contribution (both in kind and cash), mode of migration, relation to this households, if migration is seasonal (specify months of migration)

Migrant person	Relation to households	Mode of migration		His contributions to a household per year		Place of migration	Use of contribution	What contribution you made for him/her
		permanent	Seasonal (in which months)	In cash	In kind			

2. If your answer is yes to Q.1, why?  
 1. Shortage of land 2. For search of job 3. For education 4. Due to political/ criminal cases  
 5. For trading in urban area 6. Due to limited income from agriculture 7. Risk diversification 8. Other specify \_\_\_\_\_  
 3. Do you think that migration contributes to your household food security? 1= yes 2=No

### **Check list for focus group discussion**

- What is the physical background of your woreda over years?
- What are the household activities in your woreda for the last ten years?
- What are the social, economic, physical and cultural resource endowments of your woreda?
- What do you perceive about the landholding in your woreda?
- How can you explain the resource ownership of your community?
- Do your communities have social relation? How can you explain the social relationship in your community?
- What kinds of institution are available in your community (formal and informal)?
- How do you see the infrastructural development in your community?
- What is the governmental and NGOs actor's role on livelihood of your community?
- What are the major livelihood activities which are undertaken by the households in your community?
- What are the diverse livelihood activities that are undertaken by the households in your community?
- What are the motives for diverse livelihood activities?
- How do you explain the contribution of diverse activities for household food security?
- What are the push and pull factor for your livelihood diversification?
- What are the factors that are determines the livelihood diversification of households?
- What are the major constraints of diversification in your community?
- What are the food security situations of households in your community?
- What are the major factors for food insecurity in your community?
- What do you think about the role of livelihood diversification in household food security?
- What do you think about the contribution of non-agricultural income to total household income?

### Check list Key Informant Interview

- History of the area: landscape, settlement density and patterns
- Ethnic and religious tension
- Drought and famine history
- Land resource change: vegetation, soils, water use and distribution
- Change in type of staple foods and foodstuffs
- Perception towards population increase, having large family size
- Perception towards food shortage
- Perception towards livelihood diversification and its constraints in the area
- Perception towards income from diversification and its role in food security
- Perception towards community administrators
- Perception towards government extension packages
- Perception towards NGO working in the area
- Perception toward DAs

## Declaration


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

Declared by

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Candidate

Confirmed by



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Advisor

