

# Determinants of Rural Livelihood Strategies: The Case of Rural Kebeles of Dire Dawa Administration

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## Abstract

This study investigates the push and pulls factors that influence rural households' choice of livelihood strategies. The data for this study are obtained from a survey of 200 households' selected using multi stages random and purposive sampling technique from rural areas of Dire Dawa Administration in the year 2010. Multinomial logit regression was applied to identify the determinants of rural livelihood strategies followed by the rural household heads. Descriptive results addressed the economic status and livelihood strategies practiced by rural households. Out of the total sample household heads about 39 % of the total household income was derived from agriculture only, 25% from a combination of agriculture and nonfarm, 17.5% from a combination of agriculture, non-farm and off-farm and 10.5% from a combination of agriculture and off-farm activities. The multinomial logit analysis revealed that family size, safety net, age of household head, sex and distance to the market were theoretically consistent and statistically significant effect to the likelihood choice of livelihood diversification, while livestock holding, farming system and dependence ratio, were partially contrary to the expectation. Livestock holding, family size, farming system, safety net, and dependency ratio were positively and significantly related at 1% to agriculture plus off-farm, at 5% to agriculture plus non-farm and at 1% to agriculture plus non-farm plus off-farm, at 1% to agriculture plus non-farm plus off-farm and at 5% off-farm plus non-farm, 1% to agriculture plus non-farm plus off-farm and at 5% probability level to off-farm and non-farm livelihood strategy respectively. In contrary, age of household head, sex, distance to the market, livestock holding, farming system and dependency ratio were negatively significant at 10% agriculture plus off-farm, 10% to agriculture plus non-farm plus off-farm, 1% to agriculture plus off-farm, 1% agriculture plus non-farm plus off-farm, 5% to agriculture plus off-farm and 1% probability level to agriculture plus off-farm livelihood strategy respectively. The findings of the study suggest that efforts should focus on the promotion of options, substitution between assets and activities to diversify household specific agriculture-linked non-farm and off farm livelihood rather than focusing on the single agricultural productive farm by taking action to improve information, mobility and asset accumulation.

**Keywords:** determinants, Dire Dawa, livelihood strategies, rural

## 1. Introduction

### 1.1 Background of the Study

Ethiopia is a rural and agrarian society where nearly 85% of the population is directly dependent on agriculture for their livelihood. Agriculture is the mainstay of the economy. It accounts for about 50% of the GDP and 90% of the total foreign exchange earnings. The main types of farming activities are crop production, livestock husbandry and mixed farming (Beyene, 2008). The dominant type of farm input is labor and most of the farm labor comes from family members. Although of central importance, farming on its own is increasingly unable to provide a sufficient means of survival in rural areas.

In many parts of the world, the number of poor people in rural areas exceeds the capacity of agriculture to provide sustainable livelihood opportunities. According to World Bank (2007), between two-thirds and three-quarters of the estimated 1.2 billion people living below the one-dollar-a-day poverty line are estimated to live in rural areas. The rural livelihood diversification develops to become a major engine of economic growth not only for the countryside but also for the economy as a whole.

DFID (2000) defined livelihood as the capabilities, assets including material, social and activities required for a means of living. Briefly, one could describe a livelihood as a combination of the resources used and the activities undertaken in order to live. The same source defined the term livelihood strategies as the range and combination of activities and choices that people make in order to achieve their livelihood goals, including productive activities, investment strategies, reproductive choices, etc. Livelihood strategies are composed of activities that generate the means of household survival and are the planned activities that men and women undertake to build their livelihoods

In the last three decades, development researchers have focused on understanding the determinants of vulnerability of livelihood sources and intensification of poverty among rural people. This has produced much empirical studies on income and activity diversification, documenting various reasons why households simultaneously participate in more than one income earning activities (Ellis, 2000). Distinguished between pull and push factors that necessitate diversification. Pull factors are incentives that afford households the choice to participate in multiple income earning activities because they are attracted by some business opportunities such as to take advantage of forward or backward business integration or to invest their savings from some other

rewarding activity. Push factors however, are constraints that leave a household no other choice than to diversify in response to desperate circumstances where income from only one or two activities is insufficient to meet daily needs. For many poor rural households, diversification is conditioned by “push” factors. As land becomes scarce and agricultural productivity declines and households face fluctuations in their incomes, having more than one source of income becomes the only imperative option to survive.

Land is also the major determining factor of participation in non-farm employment. However, the relationship between land endowments and participation in the non-farm economy is a complex one. The relation between landholding size and the share of nonfarm income in total household income is likely to be depicted by a negatively sloped curve (Wandschneider, 2003). The reason is that rural households with good access to land are not compelled to diversify into non-farm employment to the same extent as landless or marginal farming households. In the contrary, those with limited or no access to land have to work as agricultural laborers and engage in non-farm activities in order to earn a living (Hagblade *et al.*, 2002). Constrained access to credit and financial savings, where access is an increasing function of ex ante income and wealth for reasons familiar in the development economics literature, can impede acquisition of livestock necessary to diversify out of crop agriculture (Barrett, 2001). These entry barriers tend to leave the poor with less diversified asset and income portfolios, thereby forcing them to bear both lower expected returns and higher variability in earnings.

Some studies showed that the poorest groups (landless and small-scale farmers) diversify into activities where wages are no higher than those in the agricultural sector, whilst higher income groups (larger scale farmers) also diversify, but into better paid sectors. Two processes are apparent: demand-pull, where rural people respond to new opportunities; and distress-push, where the poor are driven to seek on-farm employment for want of other on-farm opportunities. Likewise, Hagblade *et al.* (2002) share the opinion that within the rapidly changing rural economies of the developing world, economic opportunities for poor households emerge sectorally in agriculture and non-farm activities and location ally in rural areas, rural towns and urban centers. Destaw (2003) analyzed the non-farm employment and farm production of smallholder farmers in Edja district of Ethiopia using binomial logit model where the dependent variable is participation in non-farm activity, and found that distance from market and road, age, education and credit affected significantly the participation.

Glauben *et al.* (2005) analyzed the different labor market participation regimes of Chinese farm households by using household data from Zhejiang province and applying a multinomial logit model to empirically examine household, farm, and regional characteristics affecting the probability that farmers employ one of four alternative labor market regimes. Their results suggest that labor market decisions are significantly related to several personal, farm and village attributes.

The findings of Adugna (2006) in Ethiopia support the view that non-farm and farm activities compete over the limited household resources. It also implies that those households who expect secured agricultural income stay on farm and lower off-farm intensity. Despite the common knowledge that increased opportunities for rural non-farm employment would absorb the excess labor found in agriculture and tend to result in increased labor productivity..

Similarly, (Adugna,2008) study made on Livelihood Strategies and Food Security in Wolayta, Southern Ethiopia: The Case of Boloso Sore District by using multinomial model found that , age of household head, education level of household head , Dependency ratios, agro-ecology , livestock holding. Credit use, Input use, cooperatives membership, receiving remittance and family size, were affect the choice of livelihood strategy.

Fikru (2008) study focused on a case study on dominant patterns of non-farm rural diversification identify and analyze the key constraints and opportunities as well as the determinants and principal motivations behind non-farm diversification in Lume *Woreda*, Oromia Regional State. The results indicated that diversification into low-entry-barrier, low-return activities predominate. The greatest extent of diversification was amongst the ‘poor’ and ‘medium’ inhabitants. According to Ellis and Tassew (2005), data from Ethiopia household surveys indicate that nonfarm income accounts for only 8 % of rural household incomes, the lowest of any country for which data are available. In addition, surveys repeatedly found that land tenure insecurity is an important factor impeding mobility of farm labor into nonfarm jobs, since rural households perceive that prolonged absence from their village is likely to result in loss of their land.

DPFS (2004) indicated, more than 48,275 people in rural Dire Dawa are identified to be chronically food insecure and another 60,000 people are acutely affected in bad production years. A complex combination of factors has contributed to the alarming increase of rural food shortage vulnerability. Making their living on marginal, heavily degraded and less productive land; households in rural areas of Dire Dawa are facing persistent food shortages. On top of the ever decreasing land holding size and increasing population, recurrent drought and resources (land, water, forest, and rangeland) degradation in the study area have made the food security situation worse. Realizing this issue, many non-governmental organizations and government are intervening at least to lessen the adverse effects of the food problem, but there is yet little success (Ayalneh and Shimelis, 2009). They also noted in their studies that rural areas of Dire Dawa are largely moisture stressed and drought prone where cultivation of crop is rudimentary. In Dire Dawa Rural Administration, where this research is conducted, there is

no documented empirical study on the determinants of livelihood strategies. Hence, the overall aim of the study is to explore the determinants of rural livelihood strategies practiced by rural households in the study area.

### **1.2 Statement of the Problem**

Households and individuals in rural areas face different constraints on their choice of income-generating activities. Since the price and non-price incentives influencing choice are likewise heterogeneous within most populations, observed income diversification patterns can vary markedly between the poor and the rich. This, in turn, determines the rural households' livelihood strategies they follow.

Identifying livelihood strategy is not so straightforward. Even in the same locality, there can be a big contrast between the strategies of those with different socioeconomic background, for example, for those with more land and those who are with less land or landless, there is a need to understand factors that influence preference for one or other type of development intervention (Wagayehu, 2000). The reasons that individuals and households pursue diversification as a livelihood strategy are often divided into two overarching constraints, which are necessity or choice. According to (Davies, 2004) positive impacts of diversification include seasonality, risk, employment, credit and asset effects. Given that food security is a critical human development need among rural community in our country including Dire, policy makers, by tradition, were favoring agriculture as means of rural economic development for a long time. This excluded rural diversity from much attention, thereby ignoring an important source of livelihood.

The livelihood of the rural population of Dire Dawa administration region is highly dependent on agriculture. The region has an estimated population size of 342,827 of whom 32.1 % is comprised of rural households engaged in subsistence agriculture (IDP, 2004). In Dire Dawa Rural Administration, where this research is conducted, there is no documented empirical study on the determinants of rural livelihood strategies. In order to bridging the gap this study, therefore, attempted to see the determinants of livelihood strategy choice of rural people in their struggle to achieve food security goal.

### **1.3 Objectives of the Study**

The overall objective of the study was to assess the livelihood strategies practiced by rural households of Dire Dawa Administration. The specific objective of the study was:

1. to describe the livelihood strategies practiced by rural households in the study area; and
2. to identify determinants of rural households choice of livelihood strategies in the study area

### **1.4 Significance of the Study**

The findings of the study, hopefully, would help the regional rural development planners, policy makers, NGOs as an input in formulating appropriate policy for rural livelihood diversification. Furthermore, the study will generate information which will be valuable for further research on the area.

### **1.5 Scope and Limitations of the Study**

The study was limited to one region, namely, Dire Dawa Administration region. It would have been better if the research covers a wide range of areas in the country had it not been for the limited time and financial resources.

## **2. Research Methodology**

### **2.1 Description of the Study Area**

The study was undertaken in rural areas of the Dire Dawa Administration. Dire Dawa is located between 9°27'N and 9°49'N latitude and 41°38'E and 42°19'E longitude in the eastern part of Ethiopia. The Administration is bordered by the Shinile Zone of the Somali National Regional State on the north, east and west and eastern Hararge Zone of the Oromia National State on the northwest, south, south east and east. Dire Dawa city is accessible by airplane, train and cars, and is about 515 kms road distance to the east of Addis Ababa and 311 kilometers to the West of Djibouti port. The total area of the region is about 128,802 hectare: out of which urban accounts for 2684 ha (2%) and the remaining 98% is rural.

#### **2.1.1 Demographics characteristics**

The total population of Dire Dawa was estimated to be 342,827 out of which 74% (253,692) live in urban areas while the rest 26% (89,135) live in rural areas. According to CSA (2007), Population and Housing census analytical report, the total projected households are 75,693 of which 47,998 households are male headed (MHH) and the rest 27,695 female headed (FHH). Out of the total population, 49.8 % (170,897) were female and the remaining 50.2% (171,930) were male. Being one of the largest urban centers in the country, Dire Dawa has become home for peoples from a number of nations and nationalities found in the country as well as for people from India, Yemen, Turkey, etc.

The administration region has two government structures: Administration cabinet and kebele levels. There are 9 urban and 38 rural kebeles. Government offices are organized under municipality and government

executive organs (Bureaus). Owing to its strategic location and relatively better transport network agricultural products, such as coffee, livestock, fruit, vegetables and chat are produced and some of the items are exported to Djibouti. The city is acknowledged to be a centre of trade and industry in East Ethiopia. The majority of the people directly or indirectly derive their livelihood from agriculture, trade, industry and related activities.

## 2.2 Data Type and Sampling Techniques

Both primary and secondary data type were used in this study. Primary data were collected from 200 sample household heads using survey questionnaire, which was designed to generate a data on some household, farm and institutional characteristics that are related to livelihood strategies. The questionnaire was filled by six trained enumerators by interviewing the respondents Continuous supervision was made by the researcher to correct the error on the spot. Secondary data were also gathered from various sources such as books, libraries, internet, Dire Dawa bureau of agriculture and rural development office.

### 2.2.1 Sampling Techniques

Multi stages random and purposive sampling technique was used to draw a total of 5 kebeles and 200 household heads from the total of 38 kebeles. At the first stage, 38 PAs were stratified into two strata, 16 agro-pastoralists and 22 sedentary farming PAs purposively. At the second stage 5 PAs was employed to draw 2 from agro-pastoralist and 3 from sedentary farming strata randomly based on probability proportion to size. Then, at the third stage as a total of 200 household heads were randomly selected from representative kebeles by using probability proportional to size.

## 2.3 Data Analysis

The study employed both descriptive statistics, and econometric models to analyze the data.

### 2.3.1 Descriptive statistics

Descriptive statistics were applied to describe, compare and contrast different categories of sample units with respect to the desired characteristics. The method used for quantitative data analysis were, mean, percentages, t-test, F-test and chi square test used. One-way ANOVA F-test and t- test were used for continuous variables while chi square test was used for categorized variable. The multinomial logit model was used to identify the determinants of rural livelihood strategies. The data analysis was conducted using (STATA) SPSS and limdep software.

### 2.3.2 Multinomial logit model

In choosing models to identify the determinants of rural household decision to engage in various livelihood strategies, there is no natural ordering in the alternatives. Multinomial logit model is a straightforward extension of the binary logit model. The most commonly used are multinomial logit and multinomial probit. Multinomial probit model is less restrictive than multinomial logit model. However it is gained a considerable computational expense. It has also difficult to get accurate estimation of covariance matrix of the  $\beta_p$  (Judge *et al.*, 1985). On the contrary, it has some attractive features, including the provision of general patterns of cross elasticity's, it can be applied only when there is small number (usually three) alternatives, because for categories of more than three alternatives, its mathematical computation gets more complicated than multinomial logit.

Multinomial logit model is a straightforward extension of the binary logit model. However, it is worth noting that this model suffers from the assumption that the choice probabilities implied by the model must satisfy an Independence of Irrelevant Alternatives (IIA) property. This means that the ratio of probabilities of any two choices (in response categories) will be the same, regardless of what the other alternatives are. In other words, the ratio of probabilities of any two choices for a particular observation is not influenced systematically by any other alternatives. In this model, the choice probabilities are dependent on individual characteristics and the model estimates relative probabilities. Hence, for the  $i^{\text{th}}$  respondent faced with  $j$  choices, we assume that the indirect utility of a choice is superior to other choices. In equation (1),  $P_{ij}=0$ , if the individual is participating in agriculture strategy choice alone;  $P_{ij}=1$ , if the individual is participating in agriculture and off- farm combination strategy and so on, where  $P_{ij}$  is the probability of an employment of the  $j^{\text{th}}$  choice;  $j$  is livelihood strategy that the  $i^{\text{th}}$  household chooses to maximize its utility category. The number of parameters to be estimated is equal to the number of individual characteristics multiplied by the number of possible choices minus one. Each of the responses will fall into one of the categories with  $P_{ij}$  probabilities. An individual will then choose the activity type or sector that offers the highest utility.

Therefore, following Greene (2003), Multinomial Logistic Regression Model is used to identify determinants of livelihood strategies. The multinomial Logit model is specified as:

$$p(A = j) = \frac{e^{x_i \beta_j}}{\sum_{j=0}^J e^{x_i \beta_j}} \quad j=0, 1, 2 \dots J \quad (1)$$

Where: A= polychromous outcome variable with categories coded from 0... J. 0

Where P is the probability of an economic activity, j is job category;

e is natural log;  $\beta$  coefficients associated with  $X_i$  independent variables.

Equation (1) can be normalized to remove indeterminacy in the model by assuming that  $\beta_0 = 0$  and the probabilities can be estimated as:

$$Prob(A_i = j / x_i) = \frac{e^{\beta_j x_i}}{1 + \sum_{k=1}^J e^{\beta_k x_i}}, \quad j = 0, 2, \dots, J, \beta_0 = 0 \quad (2)$$

Estimating equation (2) yields the J log-odds ratios

$$\ln\left(\frac{P_{ij}}{P_{ik}}\right) = x_i'(\beta_j - \beta_k) = x_i' \beta_j, \text{ if } k = 0 \quad (3)$$

The dependent variable is therefore the log of one alternative relative to the base alternative. The multinomial logit coefficients are difficult to interpret, and associating the  $\beta_j$  with the  $j$ th outcome is tempting and misleading. To interpret the effects of explanatory variables on the probabilities, marginal effects are usually derived (Greene, 2003):

$$\delta_j = \frac{\partial P_j}{\partial x_i} = P_j \left[ \beta_j - \sum_{k=0}^J P_k \beta_k \right] = P_j (\beta_j - \bar{\beta}) \quad (4)$$

The marginal effects measure the expected change in probability of a particular choice being made with respect to a unit change in an explanatory variable (Greene, 2003).

## 2.4 Hypothesis and Variable Specification

Once the analytical procedures and their requirements are known, it is necessary to identify the potential dependent variable and explanatory variable under considerations.

### 2.4.1 The Dependent variable

If the choice of the household lies in livelihood strategies, rational household head choose among the five mutually exclusive livelihood strategy alternatives that offer the maximum utility.

The dependent variable has five categories, namely:

A=0, AG	Agriculture alone
A=1, AG+OFF	Agriculture and off-farm combination
A=2, AG+NF	Agriculture and non-farm combination
A=3, AG+OFF+NF	Agriculture, off-farm and non-farm
A=4, OFF+NF	Off-farm and non-farm combination strategy

### 2.4.2 The independent variable.

**1. Sex of the household head (SEXHH):** The household head is taken as a single decision-making body by which resources are allocated among household members. Men and women have different access to resource and opportunities (Ellis.2000). Female-headed households are hypothesized to participate less in both self employment and wage jobs relative to their male counterparts because of differential in access to credit and other resource (Zhang *et al.*, 2006). Therefore in this study sex was expected to be correlated negatively related to livelihood diversification.

**2. Age of head of the household (AGEHH):** Age refers to age of the sample HH heads in years. The study conducted by Destaw (2003) and Berhanu (2007) have indicated that age has significant effect on livelihood diversification. Although elder farmers are well established and more experienced in production and marketing strategies, they are more resistant to new ideas, and information, they are more likely to be set in their ways and

may not venture into new diversification activities (Walusimbi and Nkonya, 2004). On the other hand, young farmers are more likely to be more innovative, more energetic; they are expected to be diversifier of livelihood strategies than older farmers. Thus, it is hypothesized that the older age of household head and diversification of livelihood strategies are negatively related.

**3. Family size (FAMSHH):** The household's family size affects the diversity of household income source. Adult household size is measured as the number of adults in the household which takes into account all individuals in the household over the age of 14 years who are considered to be part of the economically active population. It is hypothesized that this variable is positively related with probability of participation in manual wage (unskilled) RNF employment and the share of income from this sector.

**4. Size of land holding (LND):** size of land holding is measured in hectares. The variable is basic asset for the majority of the rural livelihood. More land holding means more cultivation and more possibility of production and improve food security (Tesfaye, 2003). Therefore, having more land landholding size was expected to affect livelihood diversification negatively. The reason is that rural households with good access to land are not compelled to diversify into off/ non-agricultural economic activity to the same extent as landless or relatively deprived farming households, and tend to show a strong attachment to diversify into off/ non- farm livelihood strategy as a way of life (Wandschneider, 2003 and Stamoulis *et al.*, 2008).

**5. Level of education of the head (EDUHH):** Better-educated members of rural populations have better access to diversification more likely to establish their own non-farm businesses (Stamoulis *et al.*, 2008). Education increases the skill and knowledge of a person thereby, increases the productivity of income generating opportunity to engage in diversification. The years in school of the head of the household are taken as a proxy for education. It is expected to have positive on choice of diversified livelihood strategies (Tassew, 2000).

**6. Livestock (LVSTK):** Through its income effects amount of wealth affects character of employment significantly. Difference in wealth also influences access to entry in small business, including nonfarm self employment. While increase in livestock value decreases the probability of participation in unskilled wage employment and the opposite will held true for skilled nonagricultural wage employment (Tassew, 2000). Total livestock unit (TLU) is served as a unit the share of income from nonfarm employment is expected to rise with this variable.

**7. Dependency ratio (DEPR):** dependency ratio refers to the proportion of economically inactive labor force (less than 14 and above 65 years old) to the active labor force (between 15 and 65 years old (Velazco, 2003). It determines the participation of individuals in the labor market, the expenditure patterns and investment in the social sector.. Hence, this subsistence pressure tends to increase the participation in alternative livelihood strategies (Glauben *et al.*, 2005). Thus, the variable was expected to positively affect the choice of livelihood strategy by rural household.

**8. Distance to market (DISTMK):** Distance from the nearest market centers measured in kilometer (km). Proximity to the nearest market may create opportunity of more income by providing livelihood strategies, which determine income level of rural households (Barrett *et al.*, 2006). The same source implied that in remote area where physical access to market is costly, pattern of diversification is less. Improved market access can be expected to stimulate diversification Therefore; this variable was expected to positively influence the decision of rural household to participate in diversified livelihood strategy.

**9. Credit (CRDT):** Access to rural financial services can provide important incentives to invest in improved land-use practices, increase the chance of starting a small business and skill acquisition both directly through the availability of liquidity and indirectly through reduced uncertainty (Rubben and Crucx 2003). The latter effect is considered particularly important, since credit can be used for activity diversification. Hence, this variable was included in the models to capture its effect on the decision of households' participation in rural livelihood diversification and its influence on the level of income from this sector. This variable was expected to have positive correlation in preferred livelihood strategy (Destaw2003).

**10. Access to Irrigation (IRRGT):** Irrigation benefits the farm households through higher production, higher yields, lower risk of crop failure, and higher and year-round farm returns (Hussain and Hanjra, 2004). Hence, better access to irrigable water resources would increase the return on capital (land) which could probably increases the return from labor and, make the farmer better off in his wealth position, hence, reduces the subsistence pressure to participating in different livelihood activities (Velasco, 2003). Therefore, it is hypothesized negatively related with the share of income from off/ non-farm employment.

**11. Membership in cooperatives (COOPER):** Membership in cooperatives represents whether a household is member to cooperative or not. It is a dummy variable of which takes a value is 1 if a household head is a member of cooperative and 0, otherwise. This was expected to be hypothesized positively correlated with rural livelihood strategy and cooperatives are expected to promote livelihood diversification.

**12. Receiving remittance (REMMIT):** This is refers to money sent from inside or outside the country. Although remittance constitutes a small part of total households' income, it is expected to have positive contribution to the diversification of livelihood strategies (Brown *et al.*, 2006). It is a dummy variable which

takes a value one if for those who receive for service and otherwise zero.

**13. Safety net program (SFTNTP).** It is a transfer of resources to rural households and/or Individuals with the objective of enabling the community generate additional income and also build common asset thereby protect their asset depletion. It is a dummy variable of which takes a value is 1 if a household head is participate in Safety net program and 0, otherwise. This was expected to be hypothesized positively correlated with rural livelihood strategy.

**14. Farming system (FARSTM).** Farming system is a classification of agro ecological zone where diversity in land quality, distribution of rainfall, and ability to grow diverse food crop is differentially within the agro ecological zones. In the highland the distribution and amount of rainfalls better as compared to lowlands and midlands. Hence, it is hypothesized that the magnitude of household to secure in food crops decline as we go from highland to low lands therefore, we expect that the variable has negative relation with the dependent variable (Tesfaye, 2003). It is a dummy variable, which takes a value of 1 if a household head is Agro pastoralist, otherwise 0=Sedentary.

Table 1 Definition of variable affecting livelihood strategies

Variable	Definition	Values/measure	Expected sign /
SEXHD	Sex of the household head	0=male 1=female	Dummy -
AGE HH	Age of the household head	Years	Continuous -
FMSHH	Members of family size	Number	Continuous +
EDUHD	Education of the	Years of schooling	Continuous +
DPENDR	Dependency ratio	Ratio of dep to active	Continuous +
SLANDH	Total farm land cultivated	Hectares	Continuous -
LVSKHH	Livestock holding	TLU	Continuous -
DISTMK	Distance from the market	Kilometers	Continuous -
IRRGTN	Access to irrigation	1=yes, otherwise=0	Dummy -
CRDIET	Credit use by HHH	1=yes, otherwise=0	Dummy +
COOPER	Membership in cooperative	1=yes, otherwise=0	Dummy +
REMMIT	support to the HHH	1=yes, otherwise=0	Dummy +
SFTNETP	Safety net program use	1=yes, otherwise=0	Dummy +
FARSTM	Farming system	1=Agro.past, 0=Seden.	Dummy -

Source: Own survey result, 2011

### 3. Results and Discussion

The study presented in this thesis employed data gathered from different sources. Accordingly, data on socio-economic characteristics and other relevant variables related to physical and institutional factors and livelihood strategy were gathered using survey questionnaire. All these were analyzed and pooled together to present results and discussion.

#### 3.1 General Characteristics of Sampled Households

##### 3.1.1 Sex composition

Among the total sample household heads 87% were male and the remaining 13% were female. From the total sample household head about 39% of them were participating in agriculture only, 10.5% in agriculture, off farm and nonfarm; 25% in agriculture and nonfarm; 17.5% in agriculture, off farm and nonfarm livelihood strategies respectively. The proportion of participation of female headed is less by 14.94% the male headed.

##### 3.1.2 Marital status

The majority of the respondents (92%) were married, while out of the total sampled household heads about (4%) and (2%) were widowed, divorced and single respectively. The marital statuses of the sedentary and agro-pastoralist household heads were presented.

##### 3.1.3 Age composition

The age composition of a family is worth mentioning as it is a characteristic that has implication on the availability of labor for the various activities undertaken by the family. Age of the respondent household heads ranged between 20 and 85 years. About 71.5% were from age group of 20-40years. However, it worth only 3% of the households is held by the age group on the highest ladder (>60). The mean age of the head of the households is estimated to be 38 where as the standard deviation is 9. Survey respondents reflect a wide range of household heads were young on average (38 years) nevertheless, there was variation in the age of the household heads with an average number of six people

##### 3.1.4 Educational status of sampled household heads

The empirical result shows that the educational status of farmers in the study area is considerably low. In the study area as a whole, a significant share (about 61.5%) of the household heads were illiterate i.e., they do not

have both writing and reading ability either in their mother tongue or any other language. From the remaining 24.5%, of them either have joined the former Literacy campaign or informal schooling to read and write and about 6% have completed grade 1-4 level of formal schooling. Whereas 6.5%, 6.5% and 1% attended formal education from 5-8, 9-10 and 11-12 respectively in which they might be dropped at each levels. The surveyed areas also have less educational attainment. For instance, the average educational attainment of household head was less than one years of schooling.

### **3.1.5 Dependency ratio**

The total dependency ratio was calculated by dividing the sum of young (below 14 years) and old (above 64 years), by economically active population (14 to 64 years old). The overall mean dependency ratio of sample households was 1.54 with standard deviation of 1.08. As dependency ratio increases, the need for basic needs also increase. About 80% of the sample households experience a dependency ratio between zero and two. Almost 15.5% of the households involved with a dependency ratio range of 2 and 3 respectively.

### **3.1.6 Family size**

The family size of the sample households ranged from one to eleven among the sample households. The mean family size was found to be 6 people for the whole sample. About 49% of the sample households reported had a family size from four to seven. This range shows a slight difference in the two categories under consideration i.e. 48% for sedentary category followed by 50 % for agro- pastoralist. Whereas about 36% of the total sample households constitute family size ranging between 7-11 persons. The maximum and minimum of family size for households were 1 and 20 respectively. Thus household size is relatively large reflecting the existence of extended family system in the area.

## **3.2 .Farm of the Sample Households**

### **3.2.1. Size of land holding**

Farming provides the primary source of livelihood for the sample households. The average holding size was about 0.5 hectare with standard deviation of 0.46 for the sample households. This means that, with an average family size of six persons, per capita holding size would be about 0.083ha in the study area. Out of the total sample house hold 12.5% were land less, while, about 58 % of farm households have less than 0.51 hectare of land and 29% have landholding size between 0.51-2 hectares. The maximum land holding for households' were only 2.5-3 hectare (0.5%). This indicates that farming is not business-oriented and entirely subsistence as it is a survival strategy.

### **3.2.2 Access to irrigation**

Rural farmers have differential access to variety of institutional services and natural resources endowments. From the total respondents only 43 (22%) respondents are reported that they were to access to irrigation for their crop production activity in the last 12 months, while the rest 157(79%) households did not access to irrigation.

### **3.2.3 Livestock holding of the sample households**

Livestock production is the most important source of income. Hence, the number of cattle, camels, goats or sheep is a good indicator of the wealth status in the community. The mean livestock holding status of the household were four tropical livestock unit. The maximum TLU reported is 14 and the minimum is found to be zero. The majority of the households 56 (28%) hold had less than or equal to three livestock unit

## **3.3 Institutional Characteristics of the Sample Household**

### **3.3.1 Users of credit**

Credit is an important institutional service to finance poor farmers for input purchase, investment and ultimately to adopt new technology. However, some farmers have access to credit while others may not have due to problems related to repayment and down payment in order to get input from formal sources. The survey result indicated that 87 (44 %) of the total farm households were not users of credit while 113 (57%) of the total respondents had users of credit in a period of 12 months before the survey time.

### **3.3.2 Distance from the market**

Proximity to the market centers creates access to additional income by providing opportunities to access to inputs and transportation. Only (18%) of the respondents are residing within range of nearer to the main road. In the same manner the majority 82% of the households are also found to be far from the main road and market access. A long distance measured in kilometers from the farm to the nearest market reduces the probability of working off the farm.

### **3.3.3 Co-operative in members**

Membership co-operative participation coverage of the sample households is approached by asking the respondents whether they were membership co-operative in their vicinity in the lasts 12 months or not. From the total respondents 102(51%) respondents were reported that they have participated in membership co-operative for their common economic interest in the last 12 months, while the rest 98(49%) of households were not participated in any membership co-operative.



### 3.3.4 Received remittance

Remittances can have an important impact on the standard of living of households receiving them. It is another source of income for the medium, poor, and very poor households. Accordingly, 69% households are not receiving remittances within 12 months from their relatives or their families living outside their residences. Thirty one percent of the total sample households reported received remittances within 12 months from their relatives or their families living outside their residences

### 3.3.5 Participation in safety net program

It is a transfer of resources to rural households and/or Individuals with the objective of enabling the community generate additional income and also build common asset thereby protect their asset depletion. Accordingly most of the sample house hold heads were participated to the program (65.5%), while out of the total sample about (34.5%) was non participants. This indicates the study area is one of the chronic food insecure regions.

Table 2 Distribution of household's by livelihood strategy

Livelihood strategy	Frequency	Percent	Valid Percent
Only agriculture	78	39.0	39.0
Agriculture and off farm	21	10.5	10.5
Agriculture and non farm	50	25.0	25.0
Agriculture off farm and non farm	35	17.5	17.5
Off farm and non farm	16	8.0	8.0
Total	200	100	100

Own survey result, 2011

### 3.4. Tests for independent variables

Table 3 Summary test for continuous and discrete independent variable

Variable	Mean	Std	Min	Max	F	p.value
Age	38.84	9.97	20	85.0	1.13	0.342
Education	0.62	0.98	0	5.0	0.45	0.775
Family size	6.10	2.40	1	20.0	2.19*	0.072
Dependence ratio	1.50	1.08	0	4.0	3.34**	0.011
Size of land holding	1.39	1.12	0	3.0	2.25*	0.065
TLU	4.02	3.10	0	14.6	2.41**	0.051
Distance from the market	1.80	0.53	0	2.0	1.67	0.158

\*\*\*, \*\*, \*, Significant at 1%, 5% and 10% probability levels, respectively

Source: Own survey result, 2011

F-test was conducted to see the influence of the continuous/discreet variables on the livelihood strategies. Table 3 shows that family size, dependence ratio, Size of land holding and livestock holding in TLU were found to have significant relation at 10%,5%, 10% and 5% probability level to livelihood strategy practiced in the study area respectively.

Size of land holding was significant at10% probability level in descriptive statistics, but insignificant in the result of econometric model. Distance to the market is also insignificant in the in descriptive statistics, while significant in the econometric regression result. Such inconsistencies may occur due to individual effect in conditional descriptive statistics and group effect in relational econometric regression which is more expressive and determinant than the former.

Table 4 Summary of independent test for dummy variable

Variable		Livelihood Strategy					Total	$\chi^2$	p-value
		A=0	A=1	A=2	A=3	A=4			
Sex	Male	61	12	76	19	6	174	1.336	0.855
	Female	9	4	11	1	1	26		
Access to Irrigation	Yes	21	3	14	3	2	43	5.68	0.224
	No	49	13	73	17	5	157		
Farming system	Sedentary	61	15	40	26	6	148	12.805**	0.012
	Agr-post	17	6	10	9	10	52		
Cooperative Service	Yes	32	6	47	14	3	102	7.867*	0.097
	No	38	10	40	6	4	98		
Credit Users	Yes	43	10	49	7	4	113	2.847	0.584
	No	27	6	38	13	3	87		
Remittance	Yes	22	5	27	7	1	62	0.484	0.975
	No	48	11	60	13	6	138		
Safety net	Yes	36	10	65	17	3	131	19.05***	0.001
	No	43	6	22	3	4	69		

\*\*\*, \*\*, \*, Significant at 1%, 5% and 10% probability levels

Own survey result, 2011

Note: A=0= AG: Agriculture only; A=1= AG+OFF: Agriculture and off farm; A=2= AG+NF: Agriculture and nonfarm; A=3=AG+ OFF+NF: Agriculture, off farm and nonfarm; A=4= OFF+NF: off farm and nonfarm,

In cause of dummy variable considered in this study the Chi-Square test and p-value were conducted to check the significance of the variable on the livelihood diversification. The variable such as, membership in co-operative, farming system between agro-pastoralists and sedentary and safety net were found to have significant influence on livelihood strategies at 10%,5%, and 1% probability level respectively (Table 4). Co-operative in membership was significant at 10% probability level in descriptive statistics, but insignificant in the result of econometric model. Sex was also insignificant in the in descriptive statistics, while significant in the econometric regression result. The reason is similar to the continuous and discrete variable in the (Table 3).

### 3.5 Econometric Results

A multinomial logit model was tested for independence of irrelevant alternatives (IIA) assumption to estimate whether variables representing clusters of livelihood diversification patterns have significant impacts on the level of total household income, along with characteristic variables ( $p=0.214$ ). As mentioned earlier, this analysis used agriculture only as the base category for no diversification and evaluates the other choices as alternatives to this option. The first column of Table 5 for instance, compared the choice of agriculture and off farm, with agriculture only, where the marginal effects and their signs reflect the expected change in probability of preferring to agriculture only (the base) per unit change in an explanatory variable.

**Table 5. Multinomial logit regression output of livelihood strategies**

VARIABLE	A=1		A=2		A=3		A=4	
	MR.EFT	P-VLE	MR.EFT	P-VLE	MR.EFT	P-VLE	MR.EFT	P-VLE
CONST	0.208	0.274	-0.346	0.149	-4.252	0.042	-0.085	0.162
SEX	0.036	0.53	-0.011	0.796	-0.142*	0.091	0.003	0.849
AGE	-0.004*	0.085	0.003	0.927	0.024	0.696	-0.002	0.193
FAMLYS	0.006	0.495	0.044**	0.016	0.039***	0.005	-0.006	0.717
EDUCA	-0.006	0.492	-0.086	0.107	-0.006	0.604	-0.003	0.668
SLANDH	-0.01	0.863	0.086	0.742	-0.024	0.829	0.03	0.466
IRRGAN	-0.034	0.159	-0.151	0.136	-0.051	0.218	-0.056	0.495
DISTMK	-0.054***	0.008	-0.023	0.812	0.057	0.395	-0.006	0.886
CREDIET	-0.034	0.224	-0.019	0.555	-0.052	0.247	-0.146	0.936
COOPRT	-0.077	0.180	-0.035	0.748	0.034	0.558	0.017	0.666
REMITT	-0.02	0.631	-0.034	0.715	-0.001	0.919	0.031	0.419
TLU	0.021***	0.005	-0.009	0.216	-0.053***	0.001	0.003	0.243
DEPNDR	-0.059***	0.009	0.07	0.219	-0.016	0.865	0.049**	0.028
SAFTNET	0.035	0.172	0.11	0.243	0.205***	0.002	-0.068	0.293
FARSTM	-0.096**	0.035	-0.055	0.654	0.25***	0.009	0.13**	0.011
Dependent variable	livelihood strategy							
Number of observations	200							
Log likelihood	-234.66							
Restricted log likelihood	-291.51							
Chi-squared	113.69							
Degrees of freedom	56							
Significance level	0.000							

Source: Own survey 2011 \*\*\*, \*\*, \*, Significant at 1%, 5% and 10% probability level

Note: A=0= AG: Agriculture only; A=1= AG+OFF: Agriculture and off farm; A=2= AG +NF: Agriculture and nonfarm; A=3=AG+ OFF+NF: Agriculture, off farm and nonfarm; A=4= OFF+NF: off farm and nonfarm, ME=Marginal effect, P-vle=p-value.

The significant variables included; Sex, age of household head, household's family Size, households' dependency ratio, livestock holding, distance to the market, farming system and safety net. But the rest were insignificant variables.

**Age of household head (AGEHH):** As expected, this variable was found significant negatively at 10% to influence farmers' decision to diversify livelihood strategy. Given all other variables in the model held constant, the likelihood of household head simultaneous choice of agriculture plus off-farm strategy relative to the base agriculture only decrease by 0.4% when age increase by one year. This implies that the participation of the household head in agriculture plus off-farm strategy decrease as they get old. The possible reason is that farmers, whose age is relatively younger, could be pushed to engage more in agriculture plus off-farm strategy than agriculture alone. This is because, younger farm households cannot get enough land to support their livelihood compared to the older farm households This result is congruent with previous studies by Berhanu(2007)and(Fikru Tsfaye,2008).

**Family size (FAMSHH):** In line with expectation, family size was found to have positively significant relation to AG+NF and AG+ OFF+NF strategies at 5% and 1% probability level respectively. Ceteris paribus, one extra person in the household increases the likelihood of diversifying AG+NF and AG+ OFF+NF strategies increase by 4.4% and 3.9%. The positive correlation between family size and diversification might be due to the relation between larger family size and household labor in order to meet basic needs to the family relative to the benchmark alternative agriculture only. Furthermore large families are able to practice multiple activities whereas smaller ones tend to practice only agriculture with a livestock activity. In other words, additional family member decreases the likelihood of working only on farming. This finding is similar to that of Bezemer and Lerman (2002).

**Dependency ratio (DEPR):** Contrary to hypothesized, dependency ratio found negatively and significantly correlated to the choice decision of AG+ OFF at 1% probability level. This means when the dependency ratio increases by a ratio, the ability of farmers to meet family needs decrease and chance of diversifying livelihood to agriculture plus off-farm strategy decreases. If the dependency ratio increases the probability of the household's to work on agriculture plus off-farm livelihood strategy decreases by 5.9 %. This finding is similar to that of( Fikru, 2008).On the other hand, in line with the hypothesized it is found positively and significantly correlated with choice decision of the house hold to diversify AG+ OFF+NF. This implies that as family of inactive labour force increases by a ratio, the likely probability of the household to need more food for survival

to their family would increase and the ability to meet subsistence needs declines. Therefore, the dependency problems make the household to diversify their income source. This tends the house hold to increase the choice decision on the diversification of AG+ OFF+NF by 4.9%. This result is consistent with that of Warren (2002).

**Safety net (SFTNT):** As expected, this variable has a positive correlation and significant with livelihood strategy at 1% probability level. The multinomial logit estimate for an increase in Safety net with AG+ OFF+NF livelihood strategy to the base variable agriculture alone, given the other variables in the model are held constant. If a subject were to increase Safety net, the multinomial odds ratio for choice of AG+ OFF+NF livelihood strategy relative to the base variable agriculture alone would be expected to increase by 20.5%. The possible reason for the result could be, the intended of the program as criteria targeting and pre identifying the poor to help them in the event of hardship or misfortune to enable them reducing the riskier situation, especially something providing financial security in the form of food for work. This may enhance likelihood of household choosing AG+ OFF+NF livelihood strategy than agriculture alone. This result is consistent with that of (Adugna, 2008).

**Sex of household head (SEX):** Gender affects diversification options, including the choice of income-generating activities due to culturally defined roles, social mobility limitations and differential ownership of/access to assets. As expected sex of household head was found to be negatively and significantly correlated at 10% probability level to diversification into off farm activities by FEHHs. Thus, keeping the influence of other factors constant; the likelihood of FEHHs choice of agriculture and off farm livelihood strategy decreases by 14.2 %. The opposite is true for the male counterparts. This result is in agreement with previous studies conducted by Adugna (2006) and Berhanu (2007).

**Livestock holding (LIVESTOK):** In line with prior expectation, livestock holding in TLU negatively influenced household's choice of agriculture plus off-farm and non-farm livelihood strategy (AG+OFF+NF) at 1% probability level and in contrary to the hypothesized it is found positively and significantly related with the choosing decision of livelihood strategy of agriculture plus off-farm livelihood strategy (AG+OFF) at 1% probability level. That means the household with lower livestock holding would be obliged to diversify his livelihood into agriculture plus off-farm livelihood strategy, while the household with higher livestock holding would be obliged to household participate more in agriculture than livelihood diversification. Ceteris paribus, the likelihood of diversifying in(AG+OFF) strategies increase by 2.1% and the likelihood of diversifying into agriculture plus off farm and non-farm livelihood strategy (AG+ OFF+NF) decreases by 5.3% for households with more livestock number in TLU relative to the benchmark alternative agriculture only. The result is in line with the findings of Berhanu (2007) and Dereje (2008).

**Distance to the market (DISTMK):** Market access is another important factor affecting livelihood strategies. ): As hypothesized it is found a negatively and significantly related with the choosing decision of livelihood strategy of agriculture plus off-farm livelihood strategy (AG+OFF) at 1% probability level. Therefore, keeping all other variables in the model held constant, the likelihood of household head far from the market simultaneous choice of agriculture plus off-farm strategy relative to the base agriculture only decrease by 5.4%. In other words, household who are nearer to the market expected to have more propensity choice by 5.4% to be engaged in agriculture plus off-farm livelihood strategy diversification compared to the referent baseline alternative agriculture only. The possible reason for the result could be, households far from market places have no easy and quick physical access to the market, to transport output and input from and to their residence and the chance of wage labor, and small business (petty trade) and other off-farm and non-farm activities are discouraging as the result diversification is decreasing. The result is in line with the findings of Tessema (2009).

**Farming system (FARSTM):** Contrary to prior hypothesis, this variable influence the decision of the household head to participate in agriculture plus non-farm livelihood strategy positively and significantly at 1% probability level to AG+ OFF+NF livelihood strategy. Keeping all other variables in the model held constant, the likelihood of household head simultaneous choice of AG+ OFF+NF and OFF+NF strategy relative to the base agriculture only increase by 25% and. The result suggests that the probability of the household head deciding on choosing the above strategy is higher than the probability of being in the reference base agriculture only. The possible justification for this could be the house hold may be nearer to the market or to the high land agro-ecology which have good opportunity for them to participate more in livelihood diversification than agriculture in the area. However, In line with prior expectation, it is found negatively and significantly related with the choosing decision of livelihood strategy of agriculture plus off-farm livelihood strategy (AG+OFF) at 5% probability level. given the other variables in the model are held constant, the multinomial odds ratio for choice of (AG+ OFF) livelihood strategy relative to the base variable agriculture alone would be expected to decrease by 9.6%. The possible reason for the result could be, the house hold may be living in low land farming agro-ecological zone where agriculture is more practiced than diversification. This may reduce likelihood of household decision to diversify (AG+ OFF) livelihood strategy.

#### 4. Conclusions

The key finding of the study was that diversification across livelihood strategy helps households to increase the probability of their maintaining livelihood security, basically appreciation of the way that combinations of activities secure livelihoods. Clear identification of livelihood strategies would provide a clear base on which to focus on practical intervention. The intervention strategy should address the rural poor.

Safety net was positively and significantly related to livelihood diversification strategy. Safety net program should focus on needs identification and self targeting to address both the basic needs as well as the needs that arise from wealth specific constraints to empower asset accumulation through livelihood diversification. Self-targeting provides a diversification option for those needing diversify to survive. Therefore, safety net mechanisms should be continuing, in coping to help vulnerable people to create asset by diversification.

Sex was negatively and significantly associated to the choice of livelihood strategy. Women are generally less likely to participate in diversification of livelihood activity than men due to social constraints and requirements to stay at home to manage the household activities. Therefore, actions that ensure gender equality by increasing women's access to assets, education and economic empowerment in decision making on choice of resource allocation for livelihood diversification should be encouraged by local government and other stockholders.

The result of the study showed that livestock holding have a significant correlation with the livelihood diversification strategies. Therefore the rural livelihood strategy should not only emphasis on increasing herding of livestock production, but also attention should be given in promoting combination of activities to diversify livestock value added products for additional income generating activities.

Market access is another important factor affecting livelihood strategies. Distance to the market was negatively and significantly associated to the choice of livelihood strategy. Household who have access to market have higher involvement in livelihood diversification. Therefore, infrastructure in the study areas particularly roads which affects both opportunities and access, should construct for labor mobility to enhance livelihood diversification.

The study suggests that efforts should focus on policy intervention mechanism that facilitates livelihood diversification in generating additional income sources for the rural poor by expanding networks (shared training or Apprenticeship) information, improve incentive and consultancy service on livelihood diversification opportunities to diversify agriculture-linked non-farm and off farm livelihood activities rather than focusing on the single agricultural productive farm to generate asset accumulation for rural poor.

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