CONSUMPTION POVERTY AND LIVELIHOOD DIVERSIFICATION AMONG RURAL HOUSE HOLDS OF DEBATIE WEREDA, BENISHANGUL GUMUZ REGIONAL STATE, ETHIOPIA.

M.Sc. Thesis

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M.Sc. Thesis Submitted to the Department of Economics, School of Graduate Studies at Adama Science and Technology University In partial Fulfillment for the Requirement of the Degree of Masters of Science in Development Economics.

BY

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As Thesis Research Advisor, I hereby certify that I have read and evaluated this thesis prepared, under my direction, by Dergu Demie Anbessa, Entitled: Consumption Poverty and Livelihood Diversification Among Rural Households of Debatie Wereda, Benishangul Gumuz Regional State, Ethiopia. I recommend that it be submitted as fulfilling the Thesis requirement.

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As member of the Board of Examiners of the final M.Sc. Thesis open Defense Examination, We certify that we have read and evaluated the thesis prepared by Dergu Demie Anbessa and examined the candidate. We recommended that the thesis be accepted as fulfilling the Thesis requirement for the Degree of Master of Science in Development Economics.

Chairperson	Signature	Date
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External Examiner	Signature	Date

DEDICATION

I dedicate this thesis manuscript to the love of my life; my spouse Shibere Abera Morka, my daughters Yeabsera Dergu and Nardos Dergu who paid all suffers, clarification and yet shown me the firm love and care as I went through the rigors of postgraduate studies.

STATEMENT OF THE AUTHOR

I hereby declare that this thesis is my bona fide work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for MSc degree in Development Economics at Adama Science and Technology University and is deposited in the university library to be made available to users or borrowers under the rules of the library.

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Name: Dergu Demie. Signature _____

Place: Adama Science and Technology University, Adama.

Date of submission: _____.

LIST OF ACRONOMYS AND ABREVATIONS

AE	Adult Equivalent.
BGNRS	Benishangul Gumuz National Regional State Council.
BN	Basic Needs.
BoA	Bureau of Agriculture.
BoFED	Bureau of Finance and Economic Development.
CSA	Central Statistical Authority.
FAO	Food and Agricultural Organization of the United Nation.
FDRE	Federal Democratic Republic of Ethiopia.
GDP	Gross Domestic Product.
HH_s	Households.
HICE	Household Income Consumption Expenditure.
IMF	International Monetary Fund.
IPRSP	Interim Poverty Reduction Strategy Paper.
ISSER	Institute of Statistical, Social and Economic Research.
Kcal	Kilocalorie.
LDC_S	Least Developed Countries.
MDG_S	Millennium Development Goals.
MEDaC	Ministry of Economic Development and Co-operation.
Ml	millimeter.
MoA	Ministry of Agriculture.
MoFED	Ministry of Finance and Economic Development.
NGO	Non Governmental Organizations.
NTTICC	National Tsetse and Trypanosomosis Control and Investigation Center.
ODI	Overseas Development Institute.
PASDEP	Plan For Accelerated and Sustainable Development to End Poverty.
PPA	Participatory Poverty Assessment.
PRSP	Poverty Reduction Strategy Paper.
SAP	Structural Adjustment Programmer.
SDPRP	Sustainable Development and Poverty Reduction Program.
Sq.Kms	Square Kilometers.
SSA	Sub Saharan Africa.
TLU	Tropical Livestock Unit.
UN	United Nations.
UNDP	United Nations Development Program.
UNICEF	United Nations International Children's Emergency Fund.
US	United States.
USA	United States of America.
WB	World Bank.

WDR	World Development Report.
WFP	World Food Program.

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ABSTRACT

This research is conducted in order to fill in the gap observed in consumption poverty and livelihood diversification research in Ethiopia and particularly in Benishangul Gumuze Regional State. The study was conducted in Debatie Woreda of Metekel zone in Benishangul Gumuze Region, with specific objectives of analyzing the determinants of consumption poverty and assessing the impact of livelihood diversification strategies on the rural household's poverty level. The data for the study was obtained from 346 HHs in 5 rural Kebeles selected using multi stage random sampling techniques. The primary and secondary data collected were analyzed and discussed applying descriptive statistics, binary and multinomial logit (MNL) models. The binary logit model was applied for the analysis of determinants of consumption poverty; whereas, Multinomial Logit (MNL) model was used for the analysis of livelihood diversification strategies among rural households in the area. The result indicated that out of 18 explanatory variables included in the binary logit model, 8 variables were found to be significant 1 up to 10 percent significant level. These variables included household head sex, family size, dependency ratio, age of the household head, marital status of the household head, education level of household head, distance from road, and distance from market center. On the other hand, the result revealed that out of again 18 explanatory variables included in the Multinomial Logit (MNL) model, 7 variables were found to be significant 1 up to 10 percent significant level. These variables included household head sex, age of the household head, land holding size of the household, incidence of animal disease, livestock ownership in TLU, distance from market center, and distance from road. Policies that aim at reducing household-size, dependency-ratio, investing in education to enhance access to education, that will exert positive effect on household's consumption-expenditure and also investigating the mechanisms through which livelihood diversification strategies would be sustainable and which could in the long run be combined with appropriate households income diversification mechanisms (increase in the HHs income through participation in different livelihood strategies) which further helps in order to reduce the impact of poverty on the rural HHs of the study area, are recommendations drawn from the study.

1. INTRODUCTION:

1.1. Background of the Study

According to Chris and Conor (2014), poverty is a dynamic not a static condition over long period of time because by some situations individuals can move in and move out of it. The two main determinants for whether or not an individual is considered as a poor are level of assets and direct financial resources owned by the households in a society.

UNDP (2005), indicates that Poverty is a pervasive reality of the world and becomes world's greatest challenge of the 21st century. It is generally considered as a situation in which the underprivileged do not have adequate food and shelter, lack access to education and health services, are exposed to violence, and find themselves in a state of unemployment, vulnerability and powerlessness. It is multi-dimensional and has to be looked at through a variety of indicators such as levels of income and consumption, social indicators and indicators of vulnerability to risks and socio-political access and participation.

Similarly according to Joseph Rowntree Foundation (JRF) (2012), poverty is a condition which happens when material resources of an individual are not enough to cover the costs for obtaining minimum material needs.

Lamont and Small (2008), and Harding,et al (2010), have used the role of integrated culture of the society for explanation of poverty. They used the concepts (narratives, institutions, repertoires and boundaries) which have been developed by the cultural sociologists and used by them for thirty years for explanation of poverty.

The concept of poverty is different from the concepts of inequality and vulnerability, even though they are often related. The distribution of poverty measures like income or consumption within the society referred as inequality; while, an exposure of some individuals who are not poor today but fall in to poverty in the future time due to risks of drought and other conditions referred as vulnerability (World Bank, 2005).

According to Aklilu (2012), achieving millennium development goals and poverty reduction strategies are reflections of experiences obtained and lessons learned from Structural Adjustment Programs (SAP) of IMF and World Bank. These international institution's policies and strategies imposed on developing countries through SAP contributes less to poverty reduction of a nation.

WFP (2008), indicates that poverty measurement and analysis are crucial for understanding the current situation of it, what determines the condition and then to design interventions best adopted to the poverty issues, analyze the effectiveness of current policies in reduction of the

problem and also determine whether the situation has changed or not changed is important to generate knowledge for current situation of poverty in a specific location.

As indicated by the Global Monetary Report (2014/15), around eighty percent of the global poor have been found in Sub-Saharan Africa and South Asia as compared to the other developing regions of the world.

Ethiopia's poverty levels declined sharply during the past decade from 38.7% in 2004/05 to 29.2% in 2010, and the country's Human Development Index increased significantly over the past decade, rising from 0.250 in 2000 to 0.328 in 2010 (MoFED, 2010). However, the county remains a low-income country with almost a one third of its 80 million people living below the poverty line. Ethiopia's inequality, vulnerability to income and poverty remained entrenched (World Bank 2010).

The regional state of Benishangul Gumuz in Ethiopia struggles with poverty, food insecurity, and man-made and natural disasters. This region is in a state of ongoing food insecurity that is reinforced from generation to generation, and approximately 37% of the region's population faces shortages for several months each year (Save the children, 2010-2015).

Poverty reduction is crucial for human development. The level of poverty in Ethiopia varies from region to region. In 2004/05 as compared to the other regions Benishangul Gumuz regional state reported the level of poverty that exceeded the national average of 38.7%. However, in 2010/11, the level of poverty in Benishangul Gumuz and other regions declined and becomes below the national average. Ethiopia has a modest difference in poverty level between rural and urban areas. In 2004/05 rural and urban areas poverty declined by 38.5% and 35.3% respectively, and also in 2010/11 it declined by 34.7% and 27.9% for rural and urban areas respectively. In 2010/11 the level of poverty differences among rural and urban households are small. However, rural poverty is still higher than urban poverty in regional states of Afar, Somalia, Benishangul Gumuz and Tigray where rural poverty is 41%, 35%, 30.1% and 36.5% respectively (Ethiopia MDGs Report, 2012).

Among the HHs of Gumuze, non-Gumuze and mixed ethno-cultures the proportion of food in secured were 62.5%, 79% and 48.9 % respectively. Such a disparity existed due to difference in traditional values and their cultural experiences that affect their livelihoods and saving practices, which is also the case throughout Benishangul Gumuze Region (Guyu, 2014).

1.2. Statement of the Problem

According to Samuel (2004), for long period of time Ethiopia has suffered from poverty and poverty related problems like disease and malnutrition. MoFED (2002), also indicates that the main objective of the Ethiopian government is reducing poverty and poverty related problems through implementation of SDPRP (Sustainable Development and Poverty Reduction Program)

and after this program was completed it was replaced by PASDEP (Plan For Accelerated and Sustainable Development to End Poverty) in order to reduce these problems.

According to FDRE (2008), PASDEP in the agricultural sector focuses on improving rural urban linkages, provision of specialized support services for different agro-ecological zones, market based agricultural development, and particular attention to pastoral development. These activities are supported by investments performed in rising irrigation developments, improving rural infrastructure, and improving the performance of agricultural market. According to MoFED (2010), Ethiopia five year Growth and Transformation Plan (GTP) for the period between 2011 and 2015 considers agricultural sector as crucial to social and economic development of the country and its major objective is to meet the MDGs by the end of programme period i.e, 2015.

The annual average GDP growth of Ethiopia over the last five years was 11% in the year 2006-2010. In the country the total number of people living below the poverty line declined from 39% in 2005 to 29.2% in 2010, on the other hand the total number of people living below the absolute food poverty line decreased from 38% in 2005 to 28.2% in 2010 (MoFED, 2010).

In Benishangul Gumuze Region very few poverty related studies have been conducted. However, concerning the assessment of poverty and livelihood diversification issues, no detailed study has been employed so far for the rural HHs like Debatie Wereda. Thus conducting a specific research on poverty and its linkages to livelihood diversification issues will have paramount importance and the survey results will be also crucial for the formulation and implementations of poverty reduction strategies and can serves as baseline data for further research conducted in the study area.

According to BGRC (2003), peoples in Benishangul Gumuze region have differences in the natural resources, livelihood strategies adopted, and farming practices based on differences, however, there has been no formal attempt made to assess the situation and relate it to the initiatives made to reduce poverty. This study, therefore, attempts to fill such gaps by undertaking empirical study on the livelihood diversification situations and households' poverty status.

According to Guyu (2014), in Benishangul Gumuze region particularly in Gumuz ethino-culture areas there is seasonal shortage of food supply which occurs due to extravagant consumption of food grains soon after the post-harvest period. Due to the above reason seasonal food shortage is the most frequent and sever problem in the region and particularly among the rural areas of Debatie wereda. The government of Ethiopia pursued development strategy (GTP, 2010) to continue along and build up the success of former plan PASDEP to eradicate poverty at most or reduce poverty at least by eliminating it, while there is evidence that poverty headcount has been

reduced and poverty remained widespread or pervasive in Ethiopia, particularly in the study area, hence, such situation was recognized as top priority in the government development agenda. Urban and rural poverty are mutually related that both of them have negative impact to a county's development. The poverty alleviation program, therefore, should emphasize even more on reduction of rural poverty being rural poverty can affect urban poverty and in order to curb the flow of rural poor that has congested the urban area.
In the study area, there has been no-formal efforts were made to assess consumption poverty situation and relate it to the initiatives made to reduce or alleviate it.

This study, therefore, aims to fill the gap, i.e. absence of assessing poverty situations and relate it to the initiatives made to reduce or combat such uneasy problem by undertaking empirical study on the prevailing consumption poverty situation and different livelihood strategies adopted by the rural HHs in the study area.

1.3. Objective of the study

1.3.1. General objective

The general objective of this study is to understand and analyze the level of existing poverty situation, and livelihood diversification strategies exercised by the rural households in Debatie woreda.

1.3.2. Specific objective

The specific objectives of this study are:

- To analyze the determinants of consumption poverty at households level in the study area.
- To assess the impact of livelihood diversification strategies on the household's poverty level among the rural households of the area.

1.4 Research question

The following are the research questions crucial for addressing the objectives of this study:

1. What are the major causes of the local people's consumption poverty in the study area?
2. What is the different livelihood strategies exercised by the households and its impacts on poverty status of the locality people in the study area.

1.5 Hypotheses of the study

Hypotheses are statements which states about what the theoretical proposition leads to be expect in the findings of the research. The following is hypotheses of this study:

- Size of cultivated land holding, education level of the household head, livestock ownership of the household, and income from off-farm and non-farm activities are the main determinants of consumption poverty.

1.6 Significance of the study

To become a middle-income country by 2025 and to bring total poverty Head Count ,i.e. population below poverty line to about 23 percent at the end of 2015, the government of Ethiopia has planned to continue along and building up the success of PASDEP to reducing poverty (GTP,2010). The significance of this research would be identifying poverty determinants which contribute to understand rural household's poverty level or status and livelihood diversifications in the study area. The results of this study could be helpful with the hope of providing new information's to the design, preparation and implementation of poverty alleviation programs in the study area through targeting the poor. The result can also serves as a rural poverty literature in the study area or as a baseline data for further research conducted in the same field of study.

1.7 The scope and limitation of the study

The scope of this paper is limited to the dimension of consumption poverty that can be expressed in terms of consumption expenditure of the households than using income level as a measure household's wealth and welfare. One of the limitations to this study is that, due to inconsistency in the data available to construct the welfare index using income level as a measure household's wealth and welfare, the set of indicators considered was limited and may therefore be unable to address the wider scope of poverty. In addition, the analysis was restricted to the selected 5 rural Kebeles out of the total 24 rural Kebeles in the Debatie Wereda because these selected kebeles practices different farming system and also have high population size as compared to the other kebeles, hence the results of this paper cannot be generalized to all rural households in Debatie Wereda, or in the zone or in the Region levels.
The study was focused only on the analysis of determinants of poverty and in assessing the different livelihood strategies adopted in identifying their relationship to consumption poverty.

1.8 Organization of the Thesis

This research thesis is organized in to five chapters. The first chapter deals with the introduction including background of the study, statement of the problem, research objective, significance, scope and limitation of the study.

The second chapter reviews relevant literature that includes theoretical framework of poverty and empirical studies made in Ethiopia as well as in other parts of the world and livelihood diversification and strategies. Chapter three presents the brief description of the study site, and the research methodology used in data collection and analysis. Chapter four deals with results and discussions. Finally chapter five presents summaries of findings, conclusions of the study and provides policy recommendations.

2. LITERATURE REVIEW:

2.1. The conceptual / theoretical/ Framework

2.1.1. Definition and concepts of poverty

Poverty is the multidimensional concept which refers to 'the inability of individual or households to obtain sufficient means of subsistence and the condition which lead to a decent social and economic life (Brown and Teshome , 2007; Girma , 2008). And also according to Woldehanna (2004), the Ethiopian government defines poverty as a multi-dimensional concept that extends beyond a low level of households income.

According to Sen (1976)' Poverty is a relative concept that could change over time and space. Many aspects of human conditions like social, physical, economic, moral, and psychological are affected by poverty. As a result, there are different approaches in the conceptualization of poverty. The traditional approach to poverty usually links poverty to the deprivation or lack of income or consumption. While in the modern approach; one pair of approach comprises the "Welfarist" approach. The first or the former approach aims at defining the concept of well-being on the basis of the link that exists between income and utility / standard of living /, the later approach focuses to some extent on utility.

Following either of the two, according to different individuals and institutions poverty is defined different ways. As indicated by Townsend (1985), poverty is a failure to meet minimum nutrition levels and also a failure to improve the standard of living of the individuals in the society. According to Sen (1987), poverty is defined as a failure to obtain various goods and services which satisfy needs and wants of individuals.

World Bank (2000), on the other hand defined poverty as "the economic condition in which people lack sufficient income to obtain minimal levels of health service, housing, food, closing and education". Furthermore, the idea or the concept of well-being in terms of the "Welfarist" approach is one of the priority preference views of the Economists. That is to say, to categorize a person as a "poor "or "non-poor" they consider or take expenditure on goods and services consumed by the individuals valued at market prices. This money metric utility is derived from the neo-classical theory of consumer behavior. Hence, in this situation, poverty is said to exist in a given society when people are unable to obtain the minimum basic requirements necessary to sustain life of individuals.

World Bank (1990), indicates that conceptualization of individual's well-being in terms of standards of living measures seems pragmatic in developing countries, where much emphasis is given on food security and consumption deprivation. While in developed societies, in order to understand the level of societal well-being, the aspects used are participation and right to voting. Therefore, based on the idea above, according to World Bank (1990), "poverty" is defined as the

inability to attain a minimal standard of living and perceives poverty as a multidimensional concept, including deprivation of food and consumption.

The societal well-being from the perspective of severity of poverty as "chronic" and "transient" is another approach used to define poverty. Chronic /Structural/ poverty is defined as permanent or persistent socio-economic deprivations of the society and it is linked to a host of factors like lack of productive resources, lack of skill, cultural and socio-economic factors and so on, whereas transitory poverty is temporary socio-economic deprivations of the society and it is linked to natural and man- made disasters (Jalan and Ravallion, 1998). These all implies that as there are various approaches towards the definition and conceptualization of poverty and well-being of the society. However, there are essentially three broad categories to the definition of poverty. These are:

1. **Absolute Poverty**

Absolute poverty is the set of resources of a person must acquire in order to maintain a "minimum standard of living" (WDR, 2007). It is also a specific minimum level of income needed to satisfy the basic physical needs of individuals (food, cloth and shelter) for survival (Thodaro, 2003). As indicated by MoFED (2002b), poverty line is defined as a threshold level of per capita income/ consumption or a cut of living standard level below which an individual is considered to be poor. According to Rowntree (1901), the most common method of constructing poverty line is the Cost of Basic Need (CBN) approach which explains about absolute minimum requirements of basic physical needs of individual like food, clothing, housing, education, healthcare and so on. Hence, as it is stated above, poverty is lack of basic needs, and poverty line is the minimum cost of these basic needs of individuals. In normal conditions poverty is measured with respect to poverty line. According to Thorebeke (2003), the two approaches or methods used to estimate poverty line of the HHs are the Cost of Basic Need (CBN) and the Food Energy Intake (FEI) methods.

In the other hand, according to Ravallion and Sen (1996), the CBN approach estimate poverty line by computing the HHs cost of consumption good basket which is expected to satisfy the minimum calorie requirement of individuals. Hence, the Cost of the Basic Needs (CBN) method or approach is used to measure poverty level or status of the household, because it contributes appropriate poverty line across regions and different groups as compared to the Food Energy Intake (FEI) methods (MOFED, 2002). As indicated by Mekonnen (1996, cited in Ermias, 2000) in developing countries the common practice of poverty assessment is the use of food poverty line as an absolute poverty line. Ravallion (1994), on the other hand, considers an alternative approach for constructing a poverty line through developing one bundle of goods that represent the basic needs of a person. The value of the bundle of goods is then considered as a poverty line

for the area. The valuation of the bundle of good which can be done for a specific area and also its reflection of the cost living of the area is considered as the advantage of this approach.

According to Hagenaars (1986:56), absolute poverty line is defined as:

$Z_t = Z_f + Z_{nf}$; Where, Z_t is total poverty line, Z_f is the minimum cost of food / the food poverty line, Z_{nf} is the minimum cost of non-food items.

As indicated by Greer and Thorebeke (1986), the other method of defining absolute poverty is the Food Energy Intake (FEI) approach which is used to estimates poverty line by computing the HHs level of consumption or income which is expected to satisfy the minimum calorie requirement of individuals. In other words, this method estimates poverty line by computing the level of consumption or income at which households are expected to satisfy the normative nutritional requirement of 2200Kcal per day per adult equivalent. The FEI should make a room for consistency in poverty comparisons since the stipulated relationship between food energy intake and consumption expenditure will not be the same across sub-groups or over time and will tend to shift due to differences in relative price, tastes, type of economic activity and so on.

2 **Relative poverty**

In a relative poverty concept, a person is considered as a poor if he/she has less than what others have. The fractions of mean or median income or percentiles of income distribution techniques is employed in the definition of relative poverty line. It is set either at one-half, one-third or two-third of the mean or median income or percentile of the income distribution. Depending up on the proportion chosen by the researcher the percentile of income distribution involves classification of the population in to different quartiles. Finally, the researcher decides that the population in the last one or two quartiles to be considered as a poor with the corresponding cut off income level as a relative poverty line. Relative poverty focuses on how well-off an individual is with respect to the others in the same society (WDR, 2007). Also relative poverty line is usually set at an arbitrarily selection fraction of an average income expenditure (MEDaC, 1999). The major weakness of this method is that it is not clear that whether the method is an indicator of poverty or measurement of income inequality and also it is highly subjective in which the results obtained are localized that makes inter societal comparison difficult(Ravallion, 1992).

3 **Subjective Poverty**

Subjective poverty focuses or has to do with whether or not an individual or groups actually feel poor, because those individuals considered as a poor by the standard of the day will probably have low self-esteem, and hence they see themselves as a poor (Nejeru, 2005).

The identification of the poor and the non-poor in the subjective poverty definition depends on the subjective judgment of individuals about what constitutes a socially acceptable minimum standard of living in their own societies. Therefore, unlike the above approaches, subjective poverty line depends directly on the felling and opinion of the concerned individuals to determine the minimum level of income for themselves. Sometimes the result of this approach may be misleading as it takes purely an account of individuals or groups own declaration about their position. Another point of consideration, in the conceptualization of poverty for living standard measurement of households is the choice of income or consumption as a best indicator of poverty. However, current consumption for income is preferred by the most analysts as an indicator of living standards for developing countries. This is because in fairly predictable ways, income of the poor often varies over time. This is true, particularly for under developed economies that depend on traditional production systems of the outputs (Ravallion, 1992).

On the other hand, Kyerem and Thorbecke (1991), indicates that as the consumption expenditure may reflect the purchasing power of households better than measured current income being recorded income at the time of survey may be distorted by transitory poverty condition.

2.1.2 Causes of Poverty

Understanding the causes of poverty in a well and good condition necessarily helps to investigate the determinants of poverty. The World Development Report (WDR) 2001classifies causes of poverty in to three groups. The first states that as poverty results from lacking of assets and income to acquire the basic needs such as food, closing, shelter and acceptable level of education and health. The second cause for poverty is the inadequacy of the sense of voicelessness and powerlessness in the institutions of state and society. The state and social institutions often discriminate against the poor, and which prevent them from gaining new economic opportunities and attaining social power and security. The third cause of poverty is the poor society's vulnerability to negative shocks of income, illness, natural disaster and so on, which the society themselves are unable to get around. Therefore, for understanding the determinants of poverty the way estimated starts with people's assets, finally the returns to the assets and ends with the volatility of returns (World Bank, 2001).

According to McCulloch, et al (2001), the cause of poverty is the interaction between endowments and characteristics of households and public policy and institutions. Furthermore, Haughton and Khandker (2008), provide a detailed explanation on causes or correlates of poverty according to regional level characteristics, community level characteristics, household and individual level characteristics. The Regional level-characteristics include remoteness, quality of governance, vulnerability to flooding or drought, property right and their enforcement. The community level characteristics include the availability of infrastructure (roads, water and

electricity) and services (education and health), social relationships and proximity to markets. Finally, the household and individual characteristics further divided in to demographic (dependency ratio, gender of head, age structure), economic (employment status, property owned) and social (health and nutritional status, shelter, education). In addition as indicated by Rodrik (2000), market imperfections and incompleteness are naturally associated with poverty and an exclusive focus on income or consumption status / levels constitutes too narrow an approach to development situations.

2.1.3 Burden of poverty in Ethiopia

According to MOFED (2007), poverty in Ethiopia is highly correlated with the education of the head of the household, size and composition of the households, the degree of dependency with in the household, asset ownership particularly ownership of oxen in rural areas ,the occupation of the household, and several other institutional variables that provide access to public services. Rural areas are the center of mass poverty; and, as; reflected by the food insecurity it is still a major contributor of poverty in Ethiopia.

In 2014, Ethiopia had one of the highest poverty rates in the world, with 30% of the population living or gaining less than US$1.25 per capita income per person a day (UNDP, 2014). About 40% of the rural population of Ethiopia living in poverty, and about29% of the rural population living in extreme poverty with an income of less than one dollar per capita per day (Tenna, 2012).

2.1.4 The concepts of measuring and analyzing poverty intensity

2.1.4.1 Measurement of poverty

The methods to measure poverty have been developed along with the evolution of poverty concept. The United Nations Development Program's (UNDP's) Human Development Report 2010 develops the Multi-dimensional Poverty Index or MPI. This index is a combination of the conventional and new approaches to measuring poverty and it determines on the basis of the dimensions of poverty, comprising living standards, health and education. However, the conventional approaches are still helpful and used in combination with the new approaches. Measurement of poverty is conducted through constructing a poverty line and computing poverty indices. This basic tool, the poverty line, is basically expressed as a certain amount of money incurred or spent by a person per day to buy basic goods and services to live a life without material deprivation. However, the definition of poverty line depends on how one understands

the concept of poverty. However, due to a number of factors such as difference in taste, preferences, price, and so on, poverty line varies across individuals, households, societies, etc.

The World Bank originally initiated the international poverty line and was set out at $1 per day per person in 1985 PPP prices. It finally updated to $1.08 per person in 1993 PPP prices. The World Bank set international poverty line as 1$ a day as lower poverty line and 2$ a day as upper poverty line, the World Bank (1990). According to United Nations (2005), these poverty lines are subjected to a number of constraints and criticisms. Consequently, for the sake of convenience, each nation has had its own set of poverty lines, which is stated as country- specific poverty line. All definition of poverty line however, belongs to three main types/categories of poverty definitions as stated above. The choice of poverty indices is decided after constructing poverty line based on one of its definitions elaborated above. Hence, there are three classes of poverty indices. These are the poverty headcount index, the poverty gap index and severity of poverty/ the Foster-Greer-Thorbecke(FGT) (1984) measure of intensity of poverty.

1. The head count index

The poverty head count ratio index is one of the most popular measures of poverty, which is simply defined as the ratio of the number of the poor to the total population in a society. Mathematically, the head count index can be written as: $H = q/n;$ Where, H is the head Count Index, q is the number of people earning income below the poverty line, n is the total number of people in the population(Sen, 1976). According to WDR (1990), once the poor have been distinguished from the non-poor, the simplest way to measure poverty is to express the number of poor as a proportion of the population using a poverty measure of the head count index.

However, the head count index of poverty measurement, which is still widely used is unsatisfactory measurement of poverty for two important reasons. First, it should not state nothing about how far the income of the average poor person below the poverty line, i.e. the poverty gap. Hence, the head count ratio index and the poverty gap can easily move in opposite directions. As an example, a survey conducted in Bangladesh by Khan (1977 cited in World Bank, 1993), indicated that the number of the population living below the poverty line had declined, then on the other hand the remaining poor were on average poorer, that it indicted as poverty gap had increased. Second, a poverty measure should decline if the poorest people receive a transfer from the moderately poor. However, neither the head count ratio index nor the poverty gap reflected such transfers (World Bank, 1993). The head count index is often criticized for it ignores the extent to which the poor fall below the poverty line. Due to this, it is insensitive to the depth or severity of poverty and hence, not good to assess the impact of a policy measure (Fitsum and Holden, 2003).

2. The poverty gap index

The poverty gap index is used to estimate the average distance separating the poor from the poverty line. It could be understood as the amount of income transfer needed to close the gap. The advantage of the poverty gap index over the head count ratio index is that, it indicates the depth of poverty, which is, the difference between the poverty line and the mean income of the poor expressed as a percentage of the poverty line (Fitsum and Holden, 2003).

According to Sen (1976 cited in Dercon and Krishnan, 1996), poverty gap index is the measure of the transfer needed to bring the poor to the minimum level of consumption, or it is the measure the average gap of the minimum standard of living which the poor are lacking. Alternatively, it can be stated as the total income shortfall needed to eradicate poverty. Mathematically, the poverty gap index can be computed as follows: $P_1 = \sum_{i=1}^{p} \left(z - y_i \right)$;Where, y_i is the income of individual 'i' in the population, P1 is the poverty gap index, z is the poverty line and p is the number of poor people in the population.

3. The Foster- Greer-Thorbecke measure of intensity of poverty (squared poverty gap index)

The squared poverty gap index is described as a measure of the severity of poverty by assigning each individual a weight equal to his/her distance from the poverty line (Fitsum and Holden, 2003). On the other hand according to Dercon and Krishnan (1996), the squared poverty gap index measures the intensity of poverty by squaring the transfers needed so that the poor household is given a large weight. In general, as suggested by Foster et al (1984), the three types of poverty indices can be calculated using the following formula: $P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_i}{z} \right)^\alpha$; Where, y_i is equal to consumption per adult equivalent for individual i; z is the poverty line; q is the number of people in the sample whose consumption per adult equivalent below the poverty line z, n is the total number of individuals in the community or the size of the sample in the study population and α is the poverty aversion paramerter that takes values of zero, one or two.

The FGT poverty measure formula delivers a set of indices by setting the value of α to zero, one, two repectively. Setting α equal to zero, P_0, is the head count index measuring the poverty incidence, i.e. the proportion of poor people from the total population. At P_0, all poor individuals are given equal weight and the measure is equivalent with the head count ratio. Setting α equal to one, P_1, is the povert gap measuring the depth of poverty, i.e. on average how far the poor is from the poverty line. At P_1, each poor individual is weighted by his distance to the poverty line,

(z-x), relative to z. Thus, P_1 measures the poverty gap index i.e. the distance to the poverty line for the average poor prson. Setting α equal to two, P_2, is the squared poverty gap mesuring the severity of poverty among households, i.e. ineqality among the poor and the depth of poverty.

At P_2, the weight given to each of the poor person is more than proportional to the shortfall from the poverty line.

According to World Bank (1993), the choice of measure of poverty is essential for designing poverty reduction policies. The head count index is most easily reduced by aiming policies at those just below the poverty line. The head count ratio may nevertheless be desirable, but policies helping the poorest, however, may not reduce it. The effectiveness of poverty indices should be measured by Pα for values of $\alpha > 1$. The use of the right or appropriate measure of poverty is considered as one of the methodological issues that helps in designing an anti- poverty strategy for the poor society.

2.1.5 Food and non-food poverty line measurement

Defining and measuring of poverty is the most powerful motive for public policy issues (World Bank, 1993). As recommended by Ayalenh et al., (2002), the purpose of measuring poverty is very important to have quality of data to better understand poverty. Bevan (2000), also indicates that measuring and understanding poverty is essential for the formulation of public policy in Ethiopia.

2.1.5.1 Basic food needs costs

According to Tassew (2004), the food energy requirement which is 2,200 k.cal.per day/adult equivalents has many more uses and there is a problem in setting many combinations of food items to provide this caloric intake to individuals. Therefore based on the consumption data obtained from the household survey this method is usually applied in determining food poverty line.

2.1.5.2 Non food poverty lines

Non-food poverty line in Ethiopia is estimated by using non-consumption dimensions of poverty indicators such as by housing and access to public services, health and nutrition (MOFED, 2008).

According to Ducluos (2002), it is difficult to estimate directly a non-food poverty line being the standard household survey does not gather appropriate information on quantities for non-food items.

To obtain a global poverty line the usual procedure is to "scale up" the food poverty line. As also indicated by World Bank (1993); and Hillina (2005), international standard such as poverty thresholds and poverty line used by World Bank have given rise by the work in the societal and quantitative socio-economic field.

2.1.6 Consumption /income/poverty measures

Poverty is measured through different kinds of indicators, however; MOFED used consumption for measuring poverty through employing consumption expenditure survey as a metric to measure poverty in Ethiopia context in order to define a monetary poverty line. Consumption is a better measurement for longer term household welfare than income because it is subjected to less temporal variation and it is likely to be measured more accurately than income (MOFED, 2008).
Rural household's income may fluctuate during the year according to harvest cycle for poor agrarian economies. Income flow may also be erratic for urban economies with large informal sectors, therefore; consumption may be a better measurement than income (Prennushi, 2003).

2.1.7 Quantitative poverty measurement

According to Hulme et al.,(2001), poverty in recent years, have been viewed in a more holistic sense, based at least in part on the increased credence given to the views of the poor themselves, and the concept of poverty is used to cover a wide ranging set of interrelated life chances which vary, in addition valued differently in the diverse cultures and sub-cultures of the nations.
Mwambu (2005), also indicates that to overcome questions related to poverty measurement, the quantitative approaches are believed to be the best suited methods. According to Thorebeke (2003), those the two approaches or methods mentioned before used to estimate poverty line of the HHs are the Cost of Basic Need (CBN) and the Food Energy Intake (FEI) methods.

2.1.8 Qualitative poverty measurement

The qualitative poverty measurement approach is defined as the one that purposively employees sampling method and semi-structured or interactive interviews to gather or collect data related to the people's attitudes, judgments, perceptions or preference priorities about a subject and analyze it through anthropological or sociological techniques and serves even as an alternative to conventional quantitative poverty measurement approaches (Belayeneh, 2004).

2.1.9 Participatory Poverty Assessment (PPA)

According to ODI (2001), participatory poverty assessment is a tool which is used to include poor people's view in the analysis of poverty and also it serves for the formulation of strategies to reduce the problem of poverty and poverty related issues through public policy measures implemented.

2.1.10 Conceptualizing poverty profile of Ethiopia

In Ethiopia the poverty gap index was 8.3 % in 2004/05. It was lower in urban areas (7.7%) as compared to the rural areas (8.5%). The county rural poverty severity index was 0.027 which is slightly higher than 0.026 of urban areas of Ethiopia. This the decline in the poverty severity index in rural areas leads for the decline in the national poverty of the country. As compared to the levels of the five years ago in the country the head count, poverty gap and poverty severity indices in 2004/05 declined in rural areas by 31% and 41% respectively (UN, 2010).

Poverty is multifaceted and widespread in Ethiopia. Life expectancy at birth is 50 years, infant mortality rate are 10.9% and maternal mortality rate is 720 per 100,000 live births, this shows the highest in the world. Ethiopians per capital income estimated to be the 157US$ (UNDP, 2007).

2.1.11 Rural Livelihood definitions and concepts

2.1.11.1 Household Livelihood definition

The term "livelihood " is used rather than "job" or even " source of income", and it is defined primarily as most of rural people work in agriculture (as farmer or farm workers) or get off-farm job opportunities only on seasonal basis or it is defined as an individuals and households create a living from different sources such as from production (local craft work, farming, small scale-industries), own labour, trading, transfers (from remittances and grants) (Anseeuw et al.,2001: Perret, 2003).

2.1.11.2 Livelihood concepts

Chambers and Conway (1992 /, as cited in care / 2002), consider individual capability as one dimension of livelihoods beyond access and activities of them. In addition to meeting various basic needs, livelihood is also about the management of relationships between individuals, the affirmation of personal significance and group identity, and the interrelation of each of these tasks to the others. According to Allison et al., (2001), livelihood consists of access and ownership of assets and activities which determine the living obtained by the households.

2.1.12 Livelihood diversification and tenure institutions

Ellis (1997), defined livelihood diversification 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 standard of living''.

Livelihood diversification is the attempts by individuals to find new methods to increase income and reducing of environmental risks. And also it helps to ensure customary tenure and this has a benefit for land in a way of allocative mechanism (Shipton and Goheen, 1992; Platteau, 1996). However according to Place and Hazell (1993), customary tenure doesn't have much more benefit for difference in the farm yield obtained.

Many countries revising their legislative frameworks in controlling land tenure and decentralization in their countries and this helps to understand the relationship between the land tenure and poverty reduction measures followed by each nations (Toulmin and Quan, 2000).

2.1.13 Livelihood strategies

The four main classifications of livelihood strategies in rural context for the households are:
Livelihood intensification, where the value of output per hectare of land or per animal is increased by the application of more labour, capital and technology;
Livelihood extensification , where more land or animal are brought in to production at the same level of labour ,capital and technology;
Livelihood diversification, where households diversify their economic activities away from reliance on the primary enterprises (livestock or cropping), typically seeking a wider range of non and off-farm sources of income; and migration, where people move away from their initial source of livelihood and looking for a living in another way of livelihood(Hamilton and swift, 2001).
According to Davis (1996), households may use specific or particular livelihood strategies in order to satisfy their minimum level of consumption needs.

2.1.14 Livelihood context

According to Omosa (2005), livelihood can be only understood by taking in consideration special contexts such as peoples surrounding: which includes physical, social and cultural

environment, broad political and economic structure with in which these communities exist and gaining a good knowledge of such context is important in poverty assessment issues.

2.2 Empirical Literature Review

In order to measure and to identify key determinants of poverty most of the researcher s used various methods. This is the reason why poverty is multi-dimensional phenomena whose causes are complex and difficult to measure precisely. Following this, we review the studies that have focused on developing countries in general and then studies in Ethiopia in particular through poverty studies that are scanty in the survey area.

2.2.1 Levels and Determinants of poverty in developing countries

Glewwe, Gragnolati and Zaman (2002), investigates the factors driving the changes in poverty status of a household between the years 1993 and 1998 in Vietnam using the decomposition and multinomial logit regression models. The result of their study shows that demographic characteristics, education of the household head, ethnicity, type of employment, access to infrastructure and location are among the common drives of poverty dynamics. In the other hand, Litchfield and Justino (2004), examine factors affecting the rural poverty dynamic in Vietnam using similar data set and their result confirmed the findings of Glewwe, Gragnolati and Zaman (2002) that the major drivers of poverty dynamics are education of household head, type of employment, access to infrastructure and location.

Olaniyan (2000), investigate using data from the national consumer survey of 1985, 1992, and 1996 the role of household endowments in determining poverty in Nigeria. For the three periods the survey used prohibit model and found that household's endowments are significant determinants of poverty for both urban and rural households. Particularly from these all endowments, the most crucial determinants of poverty in Nigeria is the education of the household head.

Rural poverty accounts for 63 percent of poverty worldwide, reaching 90 percent in countries like china and Bangladesh and ranges from 65 to 90 percent in Sub-Saharan Africa (World Bank, 2000).
According to Ravallion, Martin and Datt (1999), there is higher incidence of rural poverty than urban areas in almost all countries and the condition of rural the poor are far worse than those of the urban poor in terms of personal consumption levels and access to education, health, potable water and sanitation, transport, communications, and housing. The agriculture sector is penalized

through implementation of distorted government policies and neglecting (physical and social) infrastructure, which have been considered as major contributors to both rural and urban poverty.

2.2.2 Level and Determinants of poverty in Ethiopia.

Based on the poverty assessment for Ethiopia, in 2000, 42.2 percent of the population of the country lived below the national poverty line, while 22.5 percent of households were extremely poor and lived below the food poverty line of 1650 Kcals per person per day. This 22.5 percentage indicates as poverty was severing in Ethiopia (World Bank, 2006).

The rural households of Ethiopia were surveyed six times between 1994 and 2004 covering a panel data set of 1477 households in 15 kebeles by the Ethiopian Rural Household Survey (ERHS) for the analysis of poverty in terms of consumption. Based on the total household chronically poor (Dercon etal, 2006).

Bigsten and Shiemeles (2003), analyzed the dynamics of poverty in Ethiopia using ERHS (Ethiopian Rural Household Survey) 1994-1997 and employed the spells and component approach. They found that the factors that affect the probability of moving into poverty are age of the household head and dependency ratio. In addition the factors that significantly reduce the likelihood of failing into poverty are size of cultivated land, education of the household head, types of crops planted, access to local market and value of crop sales. They also found that rural areas have a modest decline in poverty, however, transient poverty dominating rural households.

Dercon and Tadesse (1999), computed indices of poverty both in rural and urban areas of Ethiopia based on the basic needs approach of poverty line construction and found out that the incidence, depth and severity of rural poverty in Ethiopia to be 31%, 11%, and 5% respectively while that of urban poverty to be 40%, 16% and 9% respectively.

A study conducted by Ellis, and Woldehanna (2005), between the year 2004 and 2005 in 31 rural and 14 urban communities stated that searching for future poverty reduction strategy requires facilitating the balance livelihood of the household's who participate in both the activities of agricultural farm and of farm occupations for rural communities of Ethiopia.

Kedir and McKay (2003), conducted a survey on urban chronic poverty based on quantitative evidence using a panel data set of the Ethiopian Urban Household Survey from 1994to 1997.They employed real total household expenditure per month as welfare indicator and the result of their survey indicate that as there is high-level of chronic poverty (25.9%) in more concentrated way particularly in the northern and central cities. Out of the total households studied 23.0% of the household's experience transitory poverty. The subjective evaluation of welfare change supported the quantitative analysis's which is considered as appreciation

approach. Their studies confirm that 40% of the case indicated is a significant match to the quantitative evidence that households income has generally declined. Based on the income and quantitative approaches through consumption expenditure the study further revealed the congruence between the subjective responses.

The productive Safety Net Program (PSNP) was a program established to provide food support to chronically food in secured households of Ethiopia. This program allocated a resource to 8.3 million peoples who were chronically food in secured rural areas of the country. This amounts to 13 percent of the total population of Ethiopia. Except the rise in the scale or in the number of chronically poor individuals the government of Ethiopia considers this as the official number of food in secured individuals in the country (Sharp, Brown and Teshome, 2006).

Tadesse (1999), analysed the dynamics and determinants of urban poverty using the 1994, 1995 and 1997 rounds of the EUHS. In this study the measure of welfare used was consumption per adult equivalent while the estimate of the poverty line was obtained following the cost of basic needs approach. The final result of the survey shows that as there is an increase in poverty between 1994 and 1995 and then a decrease from 1995 to 1997. The researcher found that as there is a negative and significant relationship of the age of the household, employment level of the household head and female-headed households has a negative and significant relationship with the incidence of poverty.

Dercon (2006) analyzes the rural poverty changes and determinants of growth during the initial phases the economic reform in Ethiopia (1989-1995). He investigated that during the period under consideration as there was to some extent an improvement in consumption and substantial reduction in poverty in Ethiopia. He also found that short run-poverty impact and shocks in Ethiopia have serious negative growth implications in the country.

On the measurement of wealth and poverty in the rural Ethiopia through data base discussion a survey was conducted by Bevan and Bereket (1995). They conducted a structured survey on 1500 households with 15 wealth-ranking in rural areas of the country. The whole field work of the survey was performed over three rounds which covers the whole year in order to obtain seasonal variations. The survey has categorized the reasons for wealth rankers under 15 different "wealth" headings; such as livestock, off- farm, land, crop, asset, saving and credit, social security, farm and household management, human capital and farm labor, political power, life events and problems, family characteristics, life and farm cycle events, income and consumption. Therefore, the result of the survey stated that social, political, cultural and personal capitals are the most dimensions for wealth and poverty of individuals in a society.

Survey by MoFED (2002) based on 1995/96 and 1999/2000 Household Income and Consumption Expenditure (HICE) indicate that as the incidence of poverty is lower in urban than

rural areas with the poverty head count ratio of 37 and 45.4 % respectively. The ratio of the urban society under food poverty i.e. those individuals whose food expenditure per adult equivalent was less than the food poverty line, was 47% in 1999/00 as compared to 41% in rural areas. Moreover, the urban food poverty head count index increased by 43.7% between the years 1999/00. The study concluded that whatever the total incidence of poverty is higher in rural areas, the food poverty in urban Ethiopia is higher than food poverty in rural areas.

Esubalew (2006), investigated using a primary household survey data of 260 households in 2006 the determinants of urban poverty in Debre-Markos town. The survey used Food Energy Intake (FEI) approach to identify the poor from the non-poor households in the area and finally found that 66 % of the household were poor. The survey obtained the head count, poverty gap, and severity index 0.66, 0.21, and 0.09 respectively. For the identification of the determinants of poverty the logistic model was employed and household size, sex and health status of the household were positively correlated with probability of being poor while in the other hand, education level, income, employment, marital status, age, housing tenure, electric connection, water source, and telephone services were negatively correlated with probability of being poor.

According to World Bank (2005), in Ethiopia it is unclear that the numbers of chronically poor people are increasing or decreasing. Since 1992, in the country at an average level, chronic poverty appears to have been little or no decline in its overall situations.

Study by Bane and Ellwood (1986) shows that quarter of female- headed households having children, they exit out of poverty when they shift their family structure in to a male- headed household. Similarly a study by Stevens (1994) by updating the work of Bane and Ellwood (1986) and found that female- household heads are less likely to move out of poverty male-household heads during the period under consideration.

Survey conducted by Dercon and Krishnan (1998) for the rounds of 1989, 1994, and 1995 examine rural poverty in Ethiopia using the longitudinal data from the ERHS (Ethiopian Rural Household Survey). They found that households have lower poverty levels when they have a better access to towns and roads, human and physical capital. They also use consumption per adult equivalent as welfare indicator and found that significant decline of poverty between 1989 and 1994 but between the year 1994 and 1995 almost no change in the condition of poverty.

3. RESEARCH METHODOLOGY:

This chapter starts by presenting and illustrating the description of the study site. It also goes through in expressing the detail research methodology followed to conduct the survey such as sampling procedure, method of data collection and analysis, model specification and the estimation diagnosis for econometric model. Finally, it presents about the definitions of variables and description of the working hypothesis.

3.1. Description of the study area

3.1.1 Location and area description

Debatie, the research area, is the second populous woreda of the region next to Assosa Woreda. Out of the total population of Debatie Woreda 11,417 are living in town and the remaining 71,503 are living in the rural areas of the woreda.

Table 1:Total population size of Debatie Woreda

Area	Male	Female	Total
Both Urban and Rural	41,575	41,345	82,920

This woreda is located 547Kms away from Addis Ababa with in Metekel zone in the north western part of the country. It shares boundaries with Mandura Woreda in the north, Amhara region in the east, Yaso Woreda in the south, and Bullen Woreda in the west. This woreda covers an area of 2,203.32sq.kms with population density of 20 persons per sq.kms The altitude of the Woreda ranges from 1500-1700 meters above sea level, with mean annual rain fall of 1700mm and temperature of about 29^0c(CSA, 2007).

In the current situation, the woreda has 3 health centers, 7 clinics and 25 health post with inadequate facilities like trained man power, insufficient drug availability, and insufficient laboratory services as compared to the increased number of the patients from time to time. Some Kebeles of the woreda during wet season could not be reached by car and most of them are reached after a drive of several hours.
The woreda is traversed here and there by some rivers among which Bekafa, Sahi, BishanAdi, Chunde,Werabu are the major ones . It has also mountains like Dimtu ,Olimayi,Shuluk, Tulu Debeka, Tulu Berodu and Gessese.

3.1.2 Farming system

The overall agro-climatic condition of the woreda is low land. In this woreda there is only one crop season in a year, which is from May to October. For majority of the population agriculture is the only means of subsistence in the rural Kebeles, however, crop production and cattle rearing are backward and more traditional. The system largely depends on the production of rain fed subsistent agriculture products mainly on the cultivation of field crops such as cereals (teff, maize, sorghum, etc) , to some extent on cultivation of oil seeds and others. An important component of the smallholder mixed farming system in the study Woreda is the livestock, which provides the society with food, draught, transportation and economic security. Oxen are the main energy sources for cultivation and threshing. The practice of Sheep and goats production and bee-keeping are also mostly back ward and traditional. Donkeys are the main means by which production is transported to the local markets. Due to the above reasons, the annual income of the HHs is very small, and majority of the population of this woreda live in poverty.

3.2. Sampling Technique and Sample Size

For the sake of gathering the robust data needed to achieve the objectives of the research, a multi-source of data collection method through purposive multi stages random sampling procedures was employed to select a sample of respondents in the area.

In the first stage, the study area was classified in to 24 rural kebeles from which strata of target rural kebeles were existed in it. Out of the above kebeles 5 rural kebeles were selected as a sample kebeles based on their difference in the farming system practiced in the study area, and such kebeles represent the area in biophysical, agricultural and socio-economic aspects i.e., it represents the main farming practices, crop varieties, socio-economic status situation of the survey area.

In the second phase the number of households in each target kebeles was identified randomly and population of HHs was identified in the area. The sample size was selected from those the above expressed HHs through simple random sampling method and each household was assigned a number. The number was then written on a piece of paper and planed in a container then randomly picked. Then interviews were conducted with the respondents.

The size was decided depending on the method with the procedure presented below.
The formula used for sample size determination was:

$$n = \frac{n_o}{1+\frac{n_o}{N}},$$ Cochran, (1977) ---------- (1)

Where: $n_o = (t)^2(p)(q)/(d)^2 = 384$(was the required sample size).

n= total sample size.

t= the value for the selected alpha level, i.e. 1.96, at 95% confidence level.

P= estimated proportion of the poor population.

q= 1-p (Non-poor population).

(p)(q)= estimate of variance.

d= acceptable margin of error for proportion being estimated.

N= population size.

d = 0.05, p = 0.5, and q=0.5.

According to the above Cochran's formula the sample the size was:

$$n = \frac{n_o}{1+\frac{n_o}{N}}$$

$$n = \frac{384}{1+\frac{384}{3435}} \approx 346.$$

The sample sizes in each Kebele were taken proportional to the total household size in each Kebeles. Households were selected by simple random sampling technique from each Kebeles.
The type of questionnaire appropriate to collect relevant information in this study was questionnaire which contains open-ended and close-ended formats.

Table 2: Number of households and sample size for the framed households.

Serial No.	Sample kebeles	Number of framed HH and sample size			
		Total HH's in the Sample kebeles	Sample HHs in the kebeles	% share	Production Season
1	Angtok	765	77	22%	Meher only
2	Sireben	574	58	17%	Meher only
3	Berber	771	78	23%	Meher only
4	Parzeit	589	59	17%	Meher only
5	Girz	736	74	21%	Meher only
	Total	3435	346	100%	

Source: Own survey data, 2015.

3.3 Data Type, Source and Method of Data Collection

The type of data used for this study was collected both from primary and secondary sources. The primary data was collected through farm survey, field observations and key informant interviews with the sampled farms HHs in the study area.
Through the use of the structured questionnaire the primary data was collected from the heads of sampled HHs. Before starting the actual survey, a pre-test of the questionnaire was conducted on the randomly selected HHs in order to identify unwanted or difficult questions, to observe the reaction of the respondents to the questions, and to check the appropriateness of the questionnaire. The contents of the survey questionnaire emphasized on the HHs demographic and social characteristics, asset ownership, means of livelihood and livelihood base, farming system practice, consumption and expenditure, income, market and credit, access to education, human health, water and sanitation, access to services, health situation of animals, agricultural extension services, and other relevant information in the study time 2014/15.

The data was collected from the selected rural kebeles by enumerators, who are believed to have a better knowledge of the local language and tradition, are at least completed grade 12^{th} schooling and obtain one day training before field work, on the data collection techniques. Meanwhile, during the data collection period, key informant interview was made with responsible person from the HH member. The researcher himself administered and made close supervision of the interview schedule.

The appropriate or pertinent secondary data was obtained from several published and unpublished documents and also from the governmental sources such as CSA, MoFED, Regional BoFED, Regional BOA, Debatie woreda Agriculture office, and from non-governmental sources as NGOs like Debatie woreda Agri-service Ethiopia branch office and others. In addition, sources from internet were also reviewed as supplemental sources for the study.

3.4 Method of data analysis

The collected, edited and coded data were entered in to the computer excel-sheet and further processed and also analyzed using STATA computer software in the analysis of poverty. For the purpose of data analysis this study utilized both statistical and econometric analysis. The statistical analysis includes frequency distributions, percentages, maximum, minimum, mean and standard deviations of the sample units were used to describe some important characteristics of the sample HHs. On the other hand for the econometric analysis, different econometric models were used based on the stated specific objectives of the study. For the purpose of consumption poverty analysis; the binary logit model was used, which has been also used in number of poverty studies in developing countries.

Finally the Multinomial logit (MNL) model was used for the purpose of analyzing the determinants of livelihood diversification strategies and for further analysis of the impacts of those livelihood diversification strategies on poverty of rural households of the study area. According to Wooldridge (2002), the advantage of the MNL model is that it permits the analysis of decisions across more than two categories, and also it allows the determination of choice probabilities for different categories.

Thus in this study the MNL model was used which have been used in the number of poverty studies in developing countries, in which the dependent variable can take one of the four discrete values indicating the livelihood diversification strategies (for never-diversify; extensification strategy; intensification strategy; diversification strategy; migration strategy). Both of the models were discussed separately as follows.

Model Selection and Specification

Conceptual Framework: -Approaches to Measure Households' Welfare/Wealth Level

In order to compute poverty-line this study applied both Food Energy Intake (FEI)- methodology and Cost of Basic Need (CBN)-approaches for the measurement of level or status of poverty. The CBN-method contributes appropriate poverty line across regions and different groups and it is helpful in characterizing the poor and in multivariate analysis as it is considers food and non-food consumptions as opposed to FEI-method which often considered as food poverty line. Expenditures on the health, education and closing are considered as the non-food components of consumption. According to Dercon and Krishnan (1998), using the method proposed by them, aggregate consumption expenditure in real terms is converted in to adult-equivalences to adjust for the household size and composition.

Per-capita income could be used to measure the household's welfare, however, for this study the consumption measure is used as it captures better the long run welfare level than current income and may better reflect household's ability to meet the basic needs and consumption. Moreover, within the context of developing countries, Per-Capita Consumption Expenditure (PCCE) better captures the consumption smoothing behavior of the households and also it is less susceptible to measurement errors (Haughton and Khandker, 2009). The household's PCCE in adult-equivalence unit is commonly used as a preferred indicator of welfare in analyzing poverty in developing countries.

Hence for this study, the aggregate household consumption-expenditure was computed by adding up reported the household consumption-expenditure on food and non-food items to measure household's welfare level or status.

Ways to determine household's poverty-status

To determine the household's poverty- status the first step taken in consideration is obtaining an aggregate consumption-expenditure in real terms and convert it in to adult equivalences. The identification exercised to determine household's poverty-status itemizes the poor and the non-poor, which is based on some poverty-line that marks a limit to the welfare indicator. The poverty line in this case is the relative poverty line, which is set at two-thirds of mean of PCCE. Hence, within the study time, the household is classified as consumption-poor or simply poor if the welfare indicator (real PCCE in adult-equivalent unit) was below the poverty-line. The non-poor households are expressed by the indicator that is higher or equal to the poverty-line.

3.5 Model Specification for consumption poverty analysis: Modeling Poverty

In analyzing poverty one of the primary concern or question to the researcher is the adoption or implementation of an appropriate model i.e. whether to treat poverty status and transitions as changes in a continuous money metric welfare measure (consumption or income) or discrete variable. The regression techniques that are mostly used to identify the factors that contribute to poverty and analyzing consumption poverty are divided in to two main categories (Haughton and Khandker, 2008). The former regression techniques includes modeling money metric welfare indicators or their change directly in order to explain the level of PCCE, as a function of explanatory variables which are considered as causes or correlate of poverty, that are typically of individual households-level characteristics which is referred as the levels regression technique. The second method emphasize to explain whether a household is poor or non-poor by using the binary probit regression models, under which the explanatory-variables are the same as in the first type, but the dependent-variable is binary and usually taking the value of one if the household is poor and zero if the household is non-poor.

In the former method, real household's consumption expenditure per capita is regressed as dependent variable with exogenous explanatory variables. The advantage of using the former method (levels regression) is that it utilizes the information on its entirety. Nevertheless, the second method's main limitation is the loss of information in converting a continuous variable while the dichotomous regressand-model is used i,e. only the information of whether a household is poor or not is known, but the more informative information like how poor the household given by PCCE is lost due to counting on a poverty-line (Haughton and Khandker, 2009).

The various types of models have their own advantages and limitations depending on the data available and the research problem that one is interested in, and noted that the adoption of an appropriate model primarily depends up on the purpose of the study. Thus, in the analysis of poverty related studies the binary logit models are highly used. Accordingly, in this survey a model used for regression analysis is the binary logit model which is used to analyze the

determinants of consumption poverty in the study area. This model has been widely used in previous poverty-studies in other foreign countries like Uganda, South Africa and so on.

The Binary Logit Model Specification

Model Specification for Analyzing Consumption Poverty: The Binary Logit Model

In order to identify the poor in the study area, a probability model is used in which the chances of failing below the poverty-line are associated with the household's income conditions. The household may be classified as a poor or non-poor given the dependent variable of main interest, a binary logit model can be used for the analysis of the data.

Consider that a household is poor (Y=1) if per capita household food consumption is less than 2,300 Kcal per day or non-poor (Y=0) if the food consumption shortfall is less than or equal to zero.

Objective 1: Measurement of determinants of consumption poverty:

In the measurement of consumption poverty level or status, the dependent variable in this study would be binary where the sample households are categorized in to poor and non-poor.
According to Feder et al. , (1985),in case of consumption poverty measurement the appropriate and commonly recommended model is the binary logit model.
For similar empirical analysis the researchers (Adugna and Sileshi; 2013) have also used binary logit model.
Following Gujirati, (2003), logit probability model takes the following functional form as:

$$Pi = \frac{1}{1+_{e-z(i)}} \quad \text{---------- (2)}$$

Where: P_i=is 1 with the probability of HH is poor; 0 otherwise.

$$Z_i = \alpha_o + \sum_{i=1}^{n} \alpha\, ix + Ui.$$

i= 1,2,----------,n
n= number of explanatory variables.
α_o = intercept term.
α_i = coefficient of explanatory variable.
u_i =Disturbance term.
X_i=Explanatory variables.

$$Z(i) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \text{---- } + \beta_n X_n \text{ ---------- (3)}$$

Where: β_O = is the intercept.

β_1, β_2,----, β_n = are slopes of parameter in the model.

X_i = is vector of relevant determinants of consumption poverty.

Z(i) = is the dependent variable.

The above model (2) was estimated by using the maximum likelihood procedure with the help of computer software package STATA. Pi, is the probability that the households belongs to poor, while 1-Pi, is the probability that the household belongs to non-poor.

But from (2) it follows that,

$$(1\text{-}p_i) = \frac{1}{1+e^{z(i)}} \text{ ---------- (4)}$$

Therefore the odds ratio can be expressed as:

$$\left(\frac{pi}{1-pi}\right) = \frac{1+e^{z(i)}}{1+_{e^{-z(i)}}} = e^{zi} \text{----------} (5)$$

$$\frac{pi}{1-pi} = \frac{1+e^{z(i)}}{1+_{e^{-z(i)}}} = e^{\beta o} + \sum_{i=1}^{M} \beta i Yi \text{ ---------- (6)}$$

Taking in to consideration the natural log of the odds ratio of equation (6) would results in logit model as expressed below:

$$\text{In}\left(\frac{pi}{1-pi}\right) = \text{In}[\, e^{\beta o} + \sum_{i=1}^{M} \beta i Xi] = \text{Zi} \text{ ---------- (7)}$$

The logit model is shown below if the disturbance term Ui would be taken in account and it becomes:

$$\text{Zi} = \beta_o + \sum \beta i Xi + Ui \text{ ---------- (8)}$$

$$\text{Zi} = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \text{-- ---- } + \beta_{16} X_{16} + \beta_n X_n + \text{Ui.}$$

Where: β_O = is the slope intercept.

β_1, β_2,----, $\beta_{16}, \beta_n X_n$,are slopes of parameter in the intercept model.

Xi = is vector of relevant household characteristics.

Z(i) = is the dependent variable.

Ui = is the disturbance term.

The factors that determine the household to fall below the poverty line were used in the consideration of poverty line. Regarding the interpretation of the coefficients of the model, the probability of prior expected signs for the independent binary response variables in table 3 shown below were used in determining the probability of a household to be poor or non-poor.
Therefore, the above expressed binary logit econometric model is employed in the survey. The logit model coefficients shows the change in the log of the odds (poverty as a 0 or 1) associated with a unit change in the explanatory variables.

The marginal effect for the linear models are constant, however, in the case of the above logit model, it needs to calculate the marginal effects at different levels of the explanatory variables to get an idea of the range of variation of the resulting changes in the probabilities (Maddala, 1993).

Model Specification for Analyzing Livelihood Diversification Strategies: Multinomial Logit (MNL) Model

In this study to analyze the determinants of livelihood diversification strategies in identifying which diversification strategies are more relevant to the poor among the available strategies, four mutually exclusive livelihood diversification strategies were identified. These include extensification strategy; intensification strategy; diversification strategy; and migration strategy. As indicated by many literatures the MNL model is a widely used technique in applications that analyze polytomous response categories in different areas of economic and social studies. Chan (2005), expressed that the multinomial logit model is an important model to examine the determinants of household livelihood strategy choices among the alternative livelihood strategies.Thus, to identify the determinants of rural households' decision to choose which livelihood diversification strategy should to follow by them, multinomial logit model was used. In a given period of time at the disposal of the asset endowments, the condition of the rational household to choose a livelihood strategy among the alternative mutually exclusive four livelihood strategies that provides or offer the maximum utility to the household is considered as one of the assumption in his study.

Objective 2: Analyzing livelihood strategies and its relationship to consumption poverty

The measurement of different livelihood strategies would be used to analyze their impact on poverty status, the dependent variable in this study is the different livelihood strategies exercised by the farm households in the study area, i.e., it would be identified by categorizing the sampled households in to livelihood strategy groups based on their responses.

Following Greene (2003), suppose for the i^{th} respondent faced with j choices, the utility choice j can be expressed as: $U_{ij} = Z_{ij\beta + u_{ij}}$ ---------- (9)

If the respondent makes choice j in particular, then U_{ij} is the maximum among the j utilities. Hence, the statistical model is derived from the probability that choice j is made. Thus the probability is stated as:

$Pro(U_{ij} > U_{ik})\ for\ all\ k \neq j$ ---------- (10)

Where: U_{ij} is the utility to the i^{th} respondent from the livelihood strategy J; and U_{ik} is the utility to the i^{th} respondent from livelihood strategy k.

Thus, among the j discrete livelihood strategies, the decision of the i^{th} household can be modeled as maximizing the expected utility by choosing the j^{th} livelihood strategies, which is expressed as:

$max_{j=} E\ (U_{ij}) = f_j(x_i) + U_{ij};\ j = 0..J$ ---------- (11)

Hence, for the polytomus dependent variable model i.e. the multinomial logit model, the dependent variable was expected to have the following values: Y=1, if the household exercised livelihood extensification strategy; Y=2, if the household exercised livelihood intensification strategy; Y=3, if the household exercised livelihood diversification strategy; and Y=4, if the household exercised migration strategy.

Let the household's livelihood strategy Pi be the discrete-variable taking the values zero, one or two or three or four for never-diversify, extensification strategy; intensification strategy, diversification strategy; and migration strategy respectively to specify the MNL-model depending up on the covariates as expressed in equation (12) below.

$Y_{i=}\ \phi_i X + U_i$ ---------- (12)

Where: X is vector of covariates including demographic, human capital and socio-economic characteristics of the household; $\boldsymbol{\phi}_i$ is vector of parameters; and U_i is the disturbance term.

The discrete outcome variable Y_i in the above equation is defined as:

$$Y_i = \begin{cases} 0\ if\ the\ HH\ pursues\ not\ to\ diversify \\ 1\ if\ the\ HH\ purues\ to\ extensify \\ 2\ if\ the\ HH\ puruses\ to\ intensify \\ 3\ if\ the\ HH\ puruses\ to\ diversify \\ 4\ if\ the\ HH\ puruses\ to\ migrate \end{cases}$$

Hence, to describe the MNL-model given the above assumptions, write the conditional probability (Y_{ij}) under which the household-i, is in a particular livelihood strategies j, and it is modeled as a function of explanatory-variables X_i which is expressed as follows:

Let Y denote a random variable taking on the values $\{0,1,2,3,4\}$, and let X denotes a set of conditioning-variables. Then now other things remain constant/ ceteris-paribus the change in the

elements of X-affect the response probabilities $P_{ij=}prob(Y_{i=}\ j/\ X_i) for\ j = 0,1,2,3,4$. Being the probabilities must sum to measure,

$prob(Y_{i=}\ j/\ X_i)$ is determined once the probabilities for j= 0,1,2,3,4 is known.

$$Y_{ij=}prob(_{\ i}\ Poverty = j/\ X_i) = \frac{e^{Xi\beta j}}{\sum_{k=1}^{5} e^{Xi\beta k}} - - - - - - - - - - - - \quad (13)$$

$$Y_{ij=}prob(_{\ i}\ strategy = j/\ X_i) = \frac{e^{Xi\beta j}}{1+\sum_{k-1}^{4} e^{Xi\beta k}}\ for\ j = 0,1,2,3,4 \quad - - (14)$$

Where: β_j represents a vector of coefficients under which β_0 is set to 0, and j can take the values 0, for never-diversify; 1, for extensify; 2, for intensify; 3, for diversify; and 4, for migrate. Based up on the equation (14) expressed above, the never-diversify strategy (j = 0) is used as a base strategy or category in the regressions. And also in this study the never-diversify strategy is chosen or considered as the base outcome in order to achieve the specific objective of this survey, being it helps as a base outcome in identifying the determinants or factors which influence a deviation from this status (in to extensification, intensification, diversification and migration) and hence, to analyze the impact of these strategies on poverty status of the rural households of the study area. The estimated sets of coefficients represent the effect of the explanatory variables on the livelihood strategies such as extensification, intensification, diversification and migration relative to the base outcome.

According to Train (1986), the Independence of Irrelevant Alternatives (IIA) assumption requires that the probability of the given household being in a certain strategy (category) needs to be independent from the probability of being in another strategy or category (i.e., $P_j \big/ P_K$ is independent of the remaining probabilities). In addition to the above, in applying MNL for obtaining unbiased and consistent parameter estimates of the MNL model in the assumption of independence of irrelevant alternatives (IIA) to hold, that is the inclusion or exclusion of strategies does not affect the probabilities associated with the repressors in the remaining strategies has to be satisfied. Due to the above stated reason, alternative specific constant is used to assure that the disturbance term has zero mean and also to mitigate and in some situations to remove the inaccuracies caused due to the independence from irrelevant alternatives (IIA) which is the property of the logit model. Moreover, by using the Hausman test, the model was run and tested for the validity of the independence of the irrelevant alternatives (IIA) assumptions.

The MNL model parameter estimates only provide the direction of the effect of the independent variables on the dependent (response) variable, but estimates do not represent the actual magnitude of change and also probabilities. The marginal effect of the explanatory variables is depicted as:

$$\frac{\partial P_j}{\partial X_k} = P_j\left(\beta_{jk-}\sum_{J=1}^{J-1} P_j\beta_{jk} \quad\right) \quad ------------(15)$$

The marginal probabilities or marginal effects are the functions of the probability itself and which are used to measure the expected change in probability of a particular choice being made with respect to a unit change or difference in an independent variable from the mean (Greene, 2000).

According to Greene (2007), the parameter estimates of the MNL model give only the direction of the effect of explanatory variables on the dependent variable, but these the above parameter estimates of the MNL model neither stand for the actual size of change nor the probabilities. However, the marginal effect measures the expected change in the probability of a given choice that has been made in relation to the unit change in the explanatory variable.

3.6 Estimation Diagnosis for the Econometric Model

Before conducting model estimation, it is important to detect the presence or absence of serious multicollinearity among the continuous explanatory variables included in the model and verified the degree of association among discrete variables. In addition to multicollinearity, the existence of heteroscedasicity has to be diagnosed. The logit model was developed as an alternative to the OLS regression in the theory of econometric analysis, it is used when variables have extreme skews and thus do not meet parametric assumptions. A test for heteroskedasticity is constructed if the OLS is used (Wooldridge, 2002). However, in the application of discrete regression models, a person who conduct a research must be remember that the presence of heteroskedasticity in the latent variable model. Based on the above reason this survey used heteroskedasticity-robust standard errors, since these standard errors are asymptotically valid in the presence of any type of heteroskedasticity, including homloskedasticity. In the applied cross-sectional work robust standard errors are often reported especially when the sample size is large.

Multicollinearity Test: This test refers to a situation where it becomes difficult to determine precisely the separate influence of each explanatory variable in the model keeping other explanatory variables constant. According to Gujarati (2004), although there are no unique methods of detecting or measuring the strength of multicollinearity, there are several indicators of multicollinearity. In this study the existence of this situation was tested using the methods of Variance Inflation Factor (VIF), Tolerance and the Contingency Coefficients.

Tolerance and Variance Inflation Factor: The two methods such as Tolerance and Variance Inflation Factor (VIF) are the methods which are used to detect multicollinearity of continuous explanatory variables.

Parameter estimates of logit model may be seriously affected by the existence or presence of multicollinearity. Hence, Variance Inflation Factor (VIF) would be necessary to identify the existence or non-existence of the problem of multicollinearity among continuous explanatory variables. The VIF values are obtained by using STATA computer software. As rule of thumb, if VIF value of a variable exceeds 10 the variable is expressed as highly collinear variable (Gujarati, 1995).

Also according to Gujarati (2004), as R_i^2 increases towards one, as the co-linearity of regressor X_i with the other regressors increases and its VIF_i increase. When the value of the VIF_i is larger, the more collinear becomes the value of X_i . As the rule of thumb, if the value of the VIF exceeds 10 (it happens if R_i^2 exceeds 0.9), that variable is considered as highly collinear variable.

Hence, a measure of multicollinearity associated with the Variance Inflation Factor is expressed as:

$$VIF(X_j) = \frac{1}{1 - R_j^2} \quad ---------- (16)$$

Where R_j^2 is the coefficient of detection when the variable X_j is regressed on the other explanatory variables or it indicates the squared multiple correlation coefficient between the Xs.

TOL_j is zero, if the X_j is perfectely related to the other regressors; while it is one, if the X_j is not correlated with the other regressors. Hence, tolerance is defined as:

$$TOL_j = 1 - R_j^2 = \frac{1}{VIF_j} ----------(17)$$

Contingency Coefficient for Discrete Variables: The existence or non- existence of the problem of muliticollinearity or association of dummy/ discrete variables is tested by using coefficients of contingency (C). Contingency Coefficient is the systematic measure that shows the strength and significance of the relationship between the raw and column (or the independent) variables of the cross tabulation. This measure of association is based on the chi-square. The Contingency coefficient analysis was conducted to check the strength of the relationship among the discrete/ dummy variables. The value of contingency coefficients range between zero and one, i.e. zero value indicate that as there is no association between the raw and column variables; whereas values close to one shows that as there is a high degree of association between the dummy/ discrete variables. With respect to decision criteria, the contingency coefficient with value of 0.75 or more is considered to indicate a strong relationship among the dummy variables (used as a signal for the existence of strong association among the dummy/ discrete variables). Hence, those variables with values of C above or equal to 0.75 would be avoided from further consideration or from entering in to the logit model (Healy, 1984).
The contingency coefficients are computed as follows:

$$C = \sqrt{\frac{X^2}{N + X^2}} ---------- (18)$$

Where: C = coefficients of contingency, X^2 = chi-square test value (the chi-square random variable), and N = the total sample size.

3.7 Definition, Measurement and Hypotheses of the Study Variables

The identification or selection of the study variables for this thesis research were guided by the conceptual framework in section two above and poverty profiles for rural poverty in Ethiopia and other previous empirical works on poverty and livelihood diversification strategies in general in Ethiopia and developing countries. Accordingly, the discrete variable of HHs poverty status or level was used as dependent variable for the logit model- the consumption poverty model. This the above stated variable is a dichotomous variable representing the status of the rural HHs, and it would representing in the model 1 for poor and 0 for non-poor HHs in the study. On the other hand the categories of different livelihood strategies exercised by the rural HH head would be used as the dependent variable for the Multinomial Logit (MNL) Model.

Independent variables for both models: Published literatures and the past research findings related to this study were used for selection of explanatory variables and also as discussed earlier in the introduction and literature parts, the poverty studies in developing countries including Ethiopia indicates that several households' demographic, human capital and socio-economic factors affects the HHs poverty status and HHs livelihood strategies. However the effect of the above stated factors varies in time and space based up on specific situations in the study countries/ area under which it is important to test their effects also in the study area. Following this, the variables included as an explanatory variable in this study for both models were:

1. Family size (FAMYSIZE):

Family size refers to the total number of the HH who live under the same roof. MoFED (2002), indicates that the probability of the household to have relatively large disguised unemployment and dependents rises as the family size increases. In study area each households disguised unemployment rises as the family size increases, because most of the households relies on small plots of land for production of agricultural outputs. Therefore, large family size is hypothesized to be positively related to HH poverty status or level. Family size may have also a negative relationship with PCCE in Developing Countries (Ravallion, 1994); when the number of family-size increases, it is expected that the PCCE declines. Thus the sign of the family-size coefficient is expected to be negative on HHs consumption poverty, and positive on livelihood diversification strategies.

2. Sex of household head (SEXHHD): It is the dummy variable that refers to the sex of the head of the household, where by the value of 1 represents if the head of the household is male and 0 if female. In cases of access to technology and farming experience mostly male household heads are in a better position than female household heads. MoFED (2002), indicated that sex of the HH head as one of the main determinant of rural HHs' poverty status. Therefore, it is hypothesized that male HH heads have a better chance to escape out of poverty and female HH heads have a chance to be poor as compared to male HH heads.There are claims that female-headed households receded in to poverty more quickly than male-headed households because of the persistence of gender inequality and female's physical limitations (Sengupta, 2007).

3. Age of household head(AGEHHD):

It is a continuous explanatory variable indicating that the number of years the household head live since birth. Hilina (2005), indicates that younger household heads have the ability and capacity to engage in more income generating employments as compared to older ones. Therefore, households with older HH heads are expected to be poor as compared to HHs with the younger HH heads.

4. Education level of the Household heads (Schooling years) (EDNHHD):

It is a variable which refers to the level of education of the household head obtained through formal and non-formal education i.e., is the educational characteristics of the HH head that includes if the HH head attained (formal education, lower primary schooling, upper primary schooling, secondary and above and schooling) and is used as a proxy variable for managerial inputs. According to Fitsum and Holden(2000), the decision making of the HH head for any type of activity have positive relation with secondary education. Also it is expected that through education the quality of labor is improved and with it the tendency to allocate resources more effectively and adoption of new technologies increases. Together with increased experience higher level of education for better management of the HHs farm activities. As compared to the illiterate households, household heads with a better level of education through formal and non-formal education are expected to have a chance to diversify household's income sources, accept technical advice from extension workers, adopt better production technologies and better manage their farm practices. It generally believed that education has a positive effect on income and thus on consumption level of HHs; hence it is expected to relate positively to PCCE, while it relates negatively to poverty. Therefore, the head of household's education level which is measured in terms of years/ levels of schooling is expected to affect HHs poverty negatively and household's choice of livelihood strategies positively in poverty reduction.

5. Dependency ratio (DEPENRT):

This is a variable which indicates the ratio of children under the age of 15 and old age of above 64 to working age population (economically active age group) in a family. The level or status of poverty in the HHs have been positively associated with high dependency ratio. The likelihood of the HH to be poor increases in the family as the number of children under age of 15 and old

age of above 64 increases (Hilina, 2005). Therefore, households with high dependency ratio are hypothesized to be poor as compared to the HHs with lower dependency ratio. In the other hand dependency ratio is the variable indicating the ratio between the dependent parts of the HHs members that usually includes all household members under the age 15 and over 64; while the household members between the ages of 15-64 are considered as economically productive parts of HHs. Hence, other things remains constant, increased in dependency-ratio is likely to place extra burdens on a household's PCCE, leads the PCCE to decrease and would generally be expected to be positively related to both HHs consumption poverty, and positive on livelihood diversification strategies.

6. Marital status of the household head (MARSTAT):

This is the variable which refers to the condition where by the head of the HH is married or not. In any direction marriage is established with individuals to support each other. According to Aschalew (2006), married households are in a better position than un-married households in the utilization of resources to smoothen their life. Therefore, it is hypothesized that HHs who are not married (i.e. unmarried, divorced/ separated or widowed) are more likely to be poor as compared to the HHs who are married.

7. Size of cultivated land holding (SZCULDH):

This refers to the total cultivated land owned by the household in hectare. According to World Bank (2005), land is one of the most dominant and crucial asset for the rural society. Large cultivated land holding is expected to generate more income from crop production which further increases consumption from own production. Therefore, it is hypothesized that HHs with large size of cultivated land are more likely to be non-poor as compared to HHs with smaller land.

8. Livestock ownership in TLU (LVSTKINT):

This variable refers to the total livestock holding of the household measured in terms of Tropical Livestock Unit (TLU).Hilina (2005), indicates that the HHs with relatively large livestock ownership and then gain revenue from livestock resources are in a better position in escaping out of poverty as compared to HHs who gain lower income or no income from livestock sources. Therefore, it is hypothesized that HHs who own higher number of livestock measured in TLU are more likely to be non-poor.

9. Number of Ox owned by the household (NOXOW):

This variable refers to the number of ox the HH owns to means of drought power for land cultivation and other related farm activities. Oxen in addition increase production by providing manure. According to World Bank (1998), relatively large ownership of oxen by the HH is negatively related with poverty being it increases HHs income and consumption by boosting crop production. Thus, it is hypothesized that the HH who own large number of ox is more likely to be non-poor.

10. Incidence of animal disease (INCANDIS):

This refers the total number of livestock mostly infected with Trypanosomosis cattle disease. According to National Tse-tse and Trypanosomosis Control and Investigation Center (NTTICC) (2001), in Benishangul GumuzregionTrypanosomosis severity is high and more amount of money was spent by the households for the treatment of cattle from year to year. Thus, it is hypothesized that HH who faces lower animal disease incidence is more likely to be non-poor. On the other hand, higher animal disease incidence negatively affect livelihood of the households.

11. Farming System Practiced (FARMSYST):

This variable refers to the implementation of different farming methods in production by using various farm tools. Some of the households in the study area uses locally produced farm tools like local spear, sharpened wood and hoe, while the other households in the area uses oxen plough for crop production and hence this oxen plough generates more income that increases HHs consumption. Therefore, it is hypothesized that the uses of locally produced farm tool in farming system by the HH is positively associated with the likelihood of being poor.

12. Income from off-farm activity (INCFROFF):

It is the total amount of income that the HH family members earned in birr from various types of activities rather than income generated from production by working in farm lands. Some of the off-farm activities practiced by the HH members to boost their income are renting animals, selling farm tools, traditional healer and petty trade. Therefore, it is hypothesized that the HH who involves in off-farm activities is more likely to be non-poor.

13. Income from non-farm activities (INCONFFA):

It refers to the total amount of income that the HH earn in birr from different type of activities that do not include income gained from agricultural activities. Some of the important non-farm activities which increase HHs income are selling of fuel wood or charcoal, shopping, working as carpenter and selling of labor. According to Hilina (2005), the HHs who engaged in non-farm activities earns more income and hence has better chance to escape out of poverty. Thus, it is hypothesized that HH who participate in non-farm activities is more likely to be non-poor.

14. Distance from market center (DSTFRMRK):

This refers to the HHs access to nearest market center measured in hours traveled that is used for both purchase and selling of agricultural inputs and outputs respectively. According to Fitsum and Holden(2003), the HHs who live in areas near to the market center have better chance in increasing their production and hence rises their income being the nearby market provides them with the current valuable agricultural market information and also it creates non-farm job opportunities. Therefore, it is hypothesized that near market center to the HH is negatively related with poverty and the HH is more likely to be non-poor.

15. Access to credit (ACCTCRED):
This refers to the credit service that the HH receive in terms of birr within the last one year from micro-finance and other institutions for the purchases of agricultural inputs or HHs consumption items and to make payments for other related issues. Abebaw (2003), indicates that the HHs who get credit facility have a better chance to participate in agricultural and non-agricultural activities and hence increases their income. Thus, it is hypothesized that access to credit facility will have negative relation with poverty.

16. Access to extension service (ACTEXSER):
This refers to the number of relations or visit contacts that the HH makes with agricultural development agents in a year. The agricultural development agents have served the farmers by providing the valuable agricultural information and shows them the best methods for natural resource conservation. According to MoFED (2005), the HH who have been visited by the agricultural development agents have a better chance to increase their production and hence rise up their income. Thus, it is hypothesized that having access to extension service (visited by the agricultural development agents) has negative association with poverty.

17. Distance from road (Droad): This is a continuous explanatory variable which refers to how many hours the household members travel from their residence to get the nearest services of all-weather road. The household family members who are near to all-weather road have the chance to sell their agricultural outputs at higher prices and gain all types of related services like telephone and grain mill services. Therefore, it is hypothesized that the HH members who are closed to the all-weather road are more likely to be non-poor.

18. Household Asset (HHasset): This is the variable which refers to the types of items which are owned by the household members in terms of birr/AE during the study period. The household asset includes private house, television, mobile phone, radio and others. The household members who gain higher level of income from the sale of both agricultural and non-agricultural outputs may purchase and own higher level of household assets. Therefore, it is hypothesized that the HH who owns higher level of the household asset is more likely to be non-poor.

3.8 Definition and codes of variables

This study has the dependent variables and 18 explanatory variables (13 continuous and 5 dummy variables). Explanatory variable's operational definition their hypotheses and codes are given. The main explanatory variables expected to have influence on the rural HHs to be poor or non-poor are explained as follows.

Table 3: Definition, hypotheses and codes of variables

Code of variable	Type of variable	Hypothesis	Definition of variable
FAMYSIZE	Continuous	+	Family size in number in terms of adult equivalent
SEXHHD	Dummy	_	Sex of the HH head; 1, male; 0, female
AGEHHD	Continuous	_	Age of the HH head measured in years
EDNHHD	Continuous	+	Education level of HH head; 1, if the HH head is illiterate; 2, if the HH head is able to read and write; 3, if the HH head belongs to grade 1-4; 4, if the HH head belongs to grade 5-8; 5, if the HH head belongs to grade 9-12 and above.
DEPENRT	Continuous	_	The ratio of dependent to non-dependent in AE
MARSTAT	Dummy	_	Marital status of the HH head; 1, if the HH head is living with his/her spouse; 0, otherwise.
SZCULDH	Continuous	+	Total size of cultivated land owned by the HH head in hectare
LVSTKINT	Continuous	+	Livestock ownership (in TLU) per Adult Equivalent
NOXOW	Continuous	+	Number of oxen owned by the HH head
INCANDIS	Continuous	_	Incidence of animal disease in terms of the number of trypanosomosis infection in cattle per year.
FARMSYST	Dummy	+	Farming system practiced. HHs use of oxen Plough for farming system within the study period. 1, if the HH uses oxen-plough; 0, otherwise.
INCFROFF	Continuous	+	Income from off-farm activity in year (Birr/AE)
INCONFFA	Continuous	+	Income from non-farm activity in year (Birr/AE)
DSTFRMRK	Continuous	_	Distance from market center in hours from HHs residence.
ACCTCRED	Dummy	+	Access to credit in birr in the last one year; 1, if the HH receive credit during the study period; 0, otherwise.
ACTEXSER	Dummy	+	Access to extension services in year in number; taking the value of 1, if the HH received extension service during the study period; 0, otherwise.
Droad	Continuous	+	Distance from road in hours from HHs residence.
HHasset	Continuous	_	Household Asset (in Birr/AE).

Source: own survey data, 2015.

4. RESULTS AND DISCUSSIONS:

4.1 Descriptive Results

4.1.1 Descriptive statistics of household's major characteristics.

The data for this study were collected from 346 randomly selected households from the study area in the year 2015 through a structured questionnaire. The primary data were analysed through descriptive statistics. Descriptive statistics of the demographic, socio-economic, and institutional variables hypothesized to affect rural household poverty status or level and the HHs livelihood diversification strategies and these are provided in Table 3 below. Table 3 below presents the summary statistics of HH's PCCE, HH's relative-poverty status and other household's major characteristics over the study period and their analysis is shown as follows.

Table 4: Descriptive statistics of households' major variables- for the study period: N= 346

Variable	Continuous variables				Dummy variables		
	Mean	Std. Dev.	Min	Max	Std. Dev.	Percentage	Frequency
HHs Per Capita Consumption Expenditure	1073.82	520.18	377.36	4705.24			
Age of HH head	41	10.52	24	73			
HH asset	6016.42	474.5	3500	6800			
Distance from road	5.2	2.83	2	10			
Distance from market center	17.48	9.24	6	32			
Number of children	1.54	1.12	0	4			
Number of elders	0.07	0.27	0	2			
HH family size	3.59	1.22	1	7			
Dependency ratio	0.86	0.67	0	4			
Incidence of animal disease	0.5	1.08	0	7			
Livestock ownership in TLU	0.71	1.33	0	7			
HH head sex (Male)					0.29	91	315
HH head marital status					0.39	82	282
Education level of HH head					0.43	24	83
Size of land holding					0.18	97	335
Access to credit					0.45	29	99
Access to extension					0.49	41	141
HH Income from off-farm activity					0.47	32	111
Real poor					0.45	29	99

Source: Author's Calculation based on the survey data, 2015.

Demographic Characteristics of the Households

As can be observed from the table 4 above, the average age of the sample households in the study area is 41.00 years with the minimum and maximum of 24 and 73 years respectively. This indicates that as most of the HH heads are at the adult and above age or are matured.

When it is observed regarding the gender of the households majority of them, 315 (91.04%) were male. Moreover, from the same table we can be observe that 282(82%) of the household heads are married and live with their wives.

The sampled household's average family size is 3.60 with the minimum and maximum ranging from 1 to 7 family members respectively out of which on average 1.54 of them were children of age less than 14 years with the minimum and maximum ranging from 0 to 4 number of children and on average 0.07 of them were elder of age more than 60 years old, having up to 2 elders per the HHs in the area.

Dependency ratio for the study area is calculated by dividing the sum of the family members in the age group 0-14 and above 65 by the number of family members in the age group 15 to 65. The result indicates that 86% of the households have a dependency burden in the area; hence having on average 86% dependency-ratio ranging up 4 per the HHs.

As can be shown from the table 4 above, the mean of real consumption expenditure per adult equivalent or per- capita consumption expenditure (PCCE) was about 1073.82 with the minimum and maximum 377.34 and 4705.24 birr in the study period respectively. This implies that the households who have sufficient knowledge to earn higher level of income from various sources have the possibility of incurring higher level of consumption costs and hence this tends a household to be non-poor.

Poverty incidence and by status of sample households

Total poverty line is the sum of food and non-food poverty lines. The food poverty line is computed by calculating the minimum expenditure that would buy the minimum calories needed, i.e. dividing the average expenditures by calories and multiply this by the required calories per day (2200 calories per day per adult equivalent) (MoFED, 2005). In the other hand, calculating the average spending for non-food basic needs is used to establish the non-food poverty line. Thus the sampled population average food consumption expenditure is found to be 736.24 Birr, while the non-food basic needs average consumption expenditure is 253.52 Birr, and hence the total poverty line becomes 989.76 Birr.

When we see the households by the consumption expenditure poverty status; it can be seen that the poverty incidence, as measured by the head count index in adult equivalent units, 99(28.61%) of the households were being Real Poor or below poverty line in the study area.

As indicate in table 4 the socio-economic and institutional characteristics of the households about 111 (32.08%) of the sampled farmers reported of having non-farm income in the area. Out of the sampled farmers 335 (96.82%) of them have their own land with an average of 2.21 hectors with the minimum and maximum ranging from 1 to 4 hectors. A total of 141 (40.75%) of the farmers have reported that having contact with the extension agents but they have very few contacts with extension services in a month, i.e. only (1.6 times on average, or 1-4 times per month). Out of the total sampled respondents only 99 (28.61%) of the sampled farmers have access to credit under which they have used either from formal credit institutions or informal credit sources. Concerning the proximity to the market, the sampled farmers have traveled on average 17.48 hours to have access to market.

Human Capital Characteristics of the Households

As indicated in the Table 5 below one can observe that the majority of the sampled respondents have not attended formal education; in the study area 263 (76.01%) of the household heads are illiterate, while 64 (18.5%) of this can read and write. However, 83(23.99%) of the heads have attained at least elementary school education out of which 75(21.68%) of the household heads have completed lower and upper primary education, i.e. 1-8; and only 8(2.31%) of the household heads have completed secondary and above education in the study period.

Table 5: Descriptive statistics of education level of the sample respondents

Schooling level	Frequency	Percent
Illiterate	199	57.51
Read and write	64	18.5
1-4 Grade	65	18.79
5-8 Grade	10	2.89
9-12 Grade and above	8	2.31
Total	346	100

Source: Author's Calculation based on the survey data, 2015.

In table 5 above it is observed that the majority of the sample respondents, that is 83 (23.99%) have attained at least elementary school education out of which 65 (18.79%) have completed lower primary education, 1-4; 10 (2.89%) completed upper primary secondary education, 5-8; 8

(2.31%) have completed secondary and above education, 9-12 grade and above. In addition 199 (57.51%) of the sampled respondents are illiterate and 64 (18.5%) of them can able to read and write.

Socio-economic and institutional Characteristics of the Households

Concerning the HHs' choice of livelihood strategies, out of the total 346 sampled respondents 83 (23.99%) of the households responded of extensifying, 18 (5.2%) of them are participated in intensification, the majority of them 191 (55.2%) are participated in diversification activities (to off-farm and non-farm activities) and about 32 (9.25%) of them are participating in temporarily migration to the other neighborhood Kebeles, districts or zones for temporary labor works.

Table 6: Descriptive statistics of LDSs (Livelihood Diversification Strategies) of the sample respondents.

LDSs	Frequency	Percent
do not diversification	22	6.36
Extensification	83	23.99
Intensification	18	5.2
Diversification	191	55.2
Migration	32	9.25
Total	346	100

Source: Author's Calculation based on the survey data, 2015.

4.2 Analysis of household's major variables and by HH poverty status

Poverty and consumption expenditures

Table 7: HHs poverty and consumption expenditure when we categorize HHs by poverty status.

Variable	Mean for non-poor	Mean for poor
HHs Per Capita Consumption Expenditure	1246.43	643.19

Source: Author's Calculation based on the survey data, 2015.

The descriptive statistics in table 7 above indicates that on average per- capita consumption expenditure (PCCE) or the mean of real consumption expenditure per adult equivalent for poor is 643.19 birr and the mean for non-poor is 1246.43 birr. The survey result shows that the poor incurs lower consumption costs due to income constraint than non-poor and hence this tends a household to be poor.

Table 8: HHs major variables when we categorize HHs by poverty status; as poor &non-poor categories.

Variable	Mean for non-poor	Mean for poor	t-value	P-value
HH family size	3.22	4.52	-3.91	0.000***
Age of HH head	41.15	40.65	-4.88	0.000***
Dependency ratio	0.79	1.06	-9.69	0.000***
HH head marital status	0.81	0.84	2.18	0.030 **
Size of cultivated land holding	2.15	2.35	0.91	0.363
Livestock ownership in TLU	0.76	0.58	0.11	0.916
Incidence of animal disease	0.51	0.47	-0.82	0.412
HH Income from off-farm activity	0.35	0.25	0.08	0.936
Distance from market center	19.27	13.01	-0.77	0.440
Access to credit	0.31	0.23	-0.48	0.629
Access to extension service	0.42	0.38	0.37	0.709
Distance from road	4.92	5.90	-3.08	0.002***
HH asset	6051.13	5929.80	-2.12	0.034**

Notes: Note: * Significant at10% level; ** Significant at 5% level; *** Significant at 1% level.

Source: Author's Calculation based on the survey data, 2015.

4.2.1 Demographic Characteristics of the Households Major Variables and by poverty status

4.2.1.1 Family size

The finding in Table 8 above regarding poverty status indicates that the poor have large family size than non-poor. The mean difference for poor and non-poor households is statistically significant at 1% probability level. As compared to non-poor, the poor have on average large family size person per household. Out of total family size, the numbers of children less than age of 15years are on average 2.27 for poor, while on average 1.25 for non-poor households. This

may show that poor families have higher family size burden than non-poor due to the existence of higher composition of non-productive age groups in the household.

4.2.1.2 Age of household head

As shown in table 8 above, the average age for poor is 40.65 years, while on average 41.15 years for non-poor households and the mean difference between poor and non-poor is statistically significant at 1% probability level. This implies that younger age households have less chance to escape of out of poverty because of their lower possession of resource accumulation as compared to old age or matured households.

4.2.1.3 Dependency ratio

The descriptive statistics in table 8 above indicates that the dependency ratio on average for poor is 1.06 per household, while on average 0.79 for non-poor households. The dependency ratio mean difference between poor and non-poor is statistically significant at 1% probability level. This shows that higher burden in dependency ratio tends a household to be poor in the area.

4.2.1.4 Marital status of the household head

The finding in table 8 above shows that out of sample respondents on average the number for poor married household head is 84 percent and the average number for non-poor married household head is 81percent, while the rest are either widowed or divorced, or never married. The marital status mean difference between poor and non-poor households is statistically significant at 5% probability level. This shows that married household heads have higher decision making power on resources and hence more likely to escape out of poverty as compared to either unmarried or widowed, or divorced household heads in the area.

4.2.2 Socio-economic and institutional Characteristics of the Households and by poverty status

4.2.2.1 Size of cultivated land holding

In case of production of subsistence agriculture, cultivated land holding size is expected to reduce poverty status of rural households. As shown in table 8 above, the mean difference between poor and non-poor households regarding size of cultivated land holding have no statistically significance difference. The average cultivated land holding size for poor and non-poor is 2.35 and 2.15 hectares respectively. The result shows that size of cultivated land holding by the household has no likelihood to escape from being poor.

4.2.2.2 Livestock Ownership in TLU

From the table 8 above we can observe that the mean difference between poor and non-poor households regarding households livestock ownership in TLU have no statistically significance difference. On average the number of livestock holding by the poor in TLU is 0.58 while that of non-poor is 0.76 in TLU per household. This shows that lower level of livestock holding in TLU tends a household to be poor.

4.2.2.3 Incidence of animal disease

The finding in table 8 above shows that the incidence of animal disease mostly with trypanosomosis infection on average for poor is 0.47 in cattle per year, while on average 0.51 is for non-poor households. The mean difference for incidence of animal disease between poor and non-poor households is not found to be statistically significant. The survey result indicates non-poor have higher disease incidence as compared to poor. This might be due to relatively large number of cattle ownership by non-poor households, and hence high burden of animal disease incidence raises or increases the likelihood of a household to be poor.

4.2.2.4 Income from off-farm activity

The descriptive statistics in table 8 above indicates that the poor on average had lower frequency of access in one or more off-farm activities that is 0.25 contacts per year, while on average 0.35 contact per year for non-poor during the period. The mean differences between poor and non-poor households regarding access to off-farm activities to generate income have no statistically significance difference. This shows that the poor have lower dependency on off-farm activities due to insufficient knowledge for these employments and hence this tends a household to be poor.

4.2.2.5 Distance from market center

The survey result in table 8 above shows that for buying and selling of all types of agricultural products and consumption of goods distance of household's residence from market center on average for poor is 13.01 hours while on average 19.27 hours for non-poor households. The statistical value shows that the mean difference between poor and non-poor in terms of distance from market center is not found to be statistically significant. This indicates that the poor have easy access to market centers than non-poor, because these non-poor households may live far away from market center where they search for more fertile land and excellent grazing for their livestock and hence access to market center may not tend a household to be poor.

4.2.2.6 Access to credit

For the farming system of rural household credit is considered as one of the capital input. The survey result in Table 8 above shows that the poor on the average had lower frequency of access to credit that is 0.23 contacts per year as compared to 0.31 per year on average for non-poor during the study period. The statistical value shows that difference between poor and non-poor households was found to be statistically insignificant. Based on the above result the non-poor households have more frequency of access to credit and hence more likely to escape out of poverty.

4.2.2.7 Access to extension service

The number of visit that the household head makes with agricultural development agents for any advice or receiving inputs to improve households farming system. The finding in Table 8 above indicates that as compared to non-poor, the poor on average had lower frequency of contact to extension services visit with agricultural development agent that is 0.38 visits per year, while on average 0.42 visit per year for non-poor within the study period. The above result shows that non-poor households have more frequency of visit contact with agricultural development agents for advice and hence they are more likely to reduce poverty than poor households.

4.2.2.8 Distance from road

The descriptive statistics in table 8 above indicates that the distance the household's residence from all-weather road for poor on average is 5.90 in hours, while on average 4.92 in hours for

non-poor households. The statistical value shows that the mean difference between poor and non-poor households in terms of distance from road is statistically significant at 1% probability level. This indicates that the poor is far from the nearest all-weather road and hence this tends a household to be poor.

4.2.2.9 Household asset

The finding in table 8 above concerning household asset ownership indicates that the poor have on average 5929.80 birr/AE, while on average 6051.13 birr/AE for non-poor households. The mean difference for poor and non-poor households is statistically significant at 5% probability level. This shows that the poor have lower household asset ownership in birr/AE as compared to non-poor and hence higher level of household asset is expected in reducing rural household's poverty status.

4.2.2.10 Farming system practiced

The descriptive statistics in table 9 below shows that the use of the types of farming methods by using various types of farming tools such as locally produced farming tools and oxen plough complex, i.e. farming system practice its mean (on average) for poor 0.53, while on average 0.76 is for non-poor. This shows that higher use of locally produced farming tools-plough complex, lack of oxen and knowledge to use oxen-plough complex for farming tends a household to be poor. In the area at sample level Gumuz ethnic households are the majority that do not use oxen-plough complex for farming activity.

Table 9: HH farming system practiced when we categorize HHs by poverty status; as poor &non-poor categories.

Variable	Mean for non-poor	Mean for poor
Farming system practiced	0.76	0.53

Source: Author's Calculation based on the survey data, 2015.

4.2.3 Human Capital Characteristics of the Households and by poverty status

4.2.3.1 Education level of the Household head

Table 10: Frequency and percentage statistics for sample respondent's Education level when we categorize HHs by poverty status; as poor &non-poor categories.

HH head Education Level	Non-poor		Poor		Total	
Categories	FRQ	Percent	frq	Percent	Frq	Percent
Illiterate	128	64.32	71	35.68	199	57.51
Read & write	54	84.38	10	15.63	64	18.5
1-4 Grade	51	78.46	14	21.54	65	18.79
5-8 Grade	8	80	2	20	10	2.89
9-12 Grade & above	6	75	2	25	8	2.31
Total	247	71.39	99	28.61	346	100
t-value						-2.16
P-value						0.031**

Note: ** Significant at 5% probability level.

Source: Author's Calculation based on the survey data, 2015.

In the study area there are 40 elementary, 5 alternative elementary, 1 secondary and 3 preparatory schools. Elementary schools in the area are easily accessible as they can be reached within an hour travel on foot being these schools are within each rural Kebeles, while secondary schools are less accessible that one has travel two to three hours on average to reach the nearest senior secondary and preparatory schools existed in three different Kebeles of the area.

As the statistics in Table 10 above showing 35.68%, 15.63%, 21.54%, 20%, and 25% of the poor are illiterate, able to read and write, 1-4 Grade, 5-8 Grade, 9-12 Grade and above schooling respectively, while, 64.32%, 84.38%, 78.46%, 80%, and 75% of non-poor households are illiterate, able to read and write, 1-4 Grade, 5-8 Grade, 9-12 Grade and above schooling respectively. The finding indicates that the proportion of illiterate non-poor population was higher (64.32 percent) compared to poor households (35.68 percent). The mean difference for

poor and non-poor households is statistically significant at 5% probability level. This implies that in the area illiteracy would not affect the household's income.

4.3 Econometrics-Regression Results

4.3.1 Determinants of Consumption Poverty

This section focuses on examining the correlates of poverty in multivariate settings. This analysis is also important, first, in order to verify the relative role of the various factors in determining poverty level or status, and second, in order to assess the potential impact that the policy induced changes in these factors are likely to have on the probability of being poor, holding other things constant or ceteris-paribus.

The data was checked for its statistical diagnostic tests by using the different methods before conducting model estimation and the econometric analysis. To test the existence of multicollinearity in the hypothesized explanatory variables, the contingency coefficients tests which measure the association between explanatory variables based on the chi-square statistics were computed for all variables. As per the result the contingency coefficients computed for the variables were low for all variables; as the correlation matrix of coefficients are all less than 0.75, then the entire explanatory variables have no serious multicollinearity problem. Thus multicollinearity is not a serious problem and thus all variables selected as the explanatory variables were entered or included in the model for the analysis of the data. To avoid the heteroskedsticity problem robust standard error were reported.

The estimates values of coefficient of the logistic regression-model are given in the table 11 below. However, as the coefficients of the logistic regression model cannot be interpreted directly (Greene, 1997), the results are interpreted and reported in terms of the marginal effects and their significance i.e. which indicate the effect of a one-unit change in a particular variable on the probability of being in poverty by holding all other variables constant or citrus paribus. As it is observed the coefficients, robust standard errors, odds ratio, marginal effects and their statistical significance are presented in the Table 11 below. As can be indicated again in the table 11 below, most of the explanatory variables in the logit regression result are statistically significant and of expected signs. Generally the logit model fits the data well. The Wald chi-square test strongly rejects the hypothesis of no explanatory power and the model correctly predicted the observations.

The overall model is significant at 1% level of significance and the pseudo R square is 0.5523 shows that as the model predict poor in well and good condition; and also it is showing the fit of the regression and evidences that most of the explanatory variables significantly influenced nature of poverty situations.

Table 11: Logit model Regression Result: Determinants of Household's Consumption poverty

Variable	P-value	Coff.	Robust Std. Err.	odd ratio	dy/dx
HH head sex(Female)	0.092*	2.05*	1.22	7.80	0.17
Age of HH head	0.013**	-0.11**	0.04	0.90	-0.01
HH head marital status	0.042**	-2.20**	1.09	0.11	-0.18
HH family size	0.001***	1.72***	0.54	5.58	0.14
Dependency ratio	0.000***	- 6.21***	1.29	0.00	-0.50
Education level of HH head	0.031**	-1.21**	0.56	0.30	-0.10
HH asset	0.346	0.00	0.00	1.00	0.00
Size of land holding	0.345	1.20	1.27	3.30	0.10
Incidence of animal disease	0.084*	-0.72*	0.42	0.49	-0.06
Livestock ownership in TLU	0.261	0.43	0.38	1.53	0.03
Distance from road	0.042**	-0.17**	0.09	0.84	-0.01
Distance from market center	0.000***	-0.27***	0.05	0.76	-0.02
Access to extension service	0.709	0.15	0.41	1.17	0.01
HH income from off-farm activity	0.136	-0.71	0.47	0.49	-0.06
_cons	0.088*	5.26*	3.08	192.69	
				Wald $chi^2(17)$ = 83.77	
				Prob> chi^2 = 0.000	
				Pseudo R^2 = 0.5634	
Log pseudo likelihood = -90.4421					

Notes: Note: * Significant at10% level; ** Significant at 5% level; *** Significant at 1% level.

Source: Author's Calculation based on the survey data, 2015.

As it can be observed from table 11, among the variables hypothesized to influence rural HHs consumption poverty status, variables like gender (Female) household head, and household family size were found to have a positive and significant correlation with HHs poverty status. On the other hand, the variables like age of household head, marital status of household head, dependency ratio, household head education level, incidence of animal disease, distance from road, and distance from market center were found to have negative and significant correlation with HHs poverty.

Household head sex (Female): The results of the logit model indicated that the female-headed households experienced higher poverty as compared to the male-headed households. The female headed households do have 10% probability higher than the male counterpart to fall in to poverty. The likelihood that a female headed household become poor is 17% more as compared to their male headed counterpart. This might be due to socio-cultural problems of the society in developing countries. The females were discriminated in the access to land, education and different properties. Most of the working time of the females is consumed by the pregnancy and child rearing. The result of this study is also consistent with the findings of Chant (2003); and Bigstein et al (2002).

Family size: The family size or the household is defined by adult equivalent unit was found to have positive relation with poverty status of rural households and it is statistically significant at 1% level. Holding other factors constant, the more the number of the household size, the more will be the chance of falling in to poverty. The marginal effect shows that as the family size increases by one adult equivalent, the probability of being poor increases by 14% while other things remain constant. This indicates that the household which have the higher family size faces the greater difficulty in improving their poverty situations. The main reason behind is that, as the family size increase in each household it results in no means of accessing more land to cultivation to meet the demand of that large family size.

The household composition like dependency ratio in the household and age of the household head should be carefully analyzed with the household size. Because the positive result of the variable is due to the quality of household members. Also the reason for the above is that either many of them are not working (many children and elderly) or they are being remunerated poor under which the totality leads to decline in the per capita consumption expenditure.

Dependency-ratio: In addition to the above variable, dependency-ratio plays a stronger effect on the probability of failing in to poor at 1% level, suggesting that an increase in dependence-ratio will decrease the likelihood of being poor by 50%. Accordingly in this study the variable dependency ratio have a statistically significant negative correlates to the probability of being poor. That means as the members of the households below the age 15 and above 65 increases in the household, the probability of falling in to poverty decreases. This paradoxical result may be partially interpreted as indicators of economies of scale in the household but would be very implausible to completely attribute to economies of scale (Eyob, 2004). The reason is that children and elderly are more likely to be engaged in productive activities. Children particularly considered as an asset in the most developing countries and they can really engage in economic activities that change the poverty situation of a household. In line with this as discussed in the descriptive analysis section, the child dependency ratio is greater than the old dependency ratio showing that the existence of higher number of children in the household.

Age of the household head: Age was expected to have positive coefficient (a "U" shaped) relation with the poverty by assuming the productivity theory which states that productivity or income would be low at relatively younger age and also it increases at the middle age and then it decreases again at the old age. As a result, in the situations (time) under which productivity or income is considered as the main determinants of poverty, poverty would be high at the younger age and decreases at the middle age and then increases at old age.
In this study, unfortunately the logit model estimate of age was found to be inverted "U" shape with its coefficient is statistically significant at 5% level of significance. This indicates that, the older becomes the household head, the more likely the household to become non-poor. Holding other things constant, its marginal-effect value suggests that an increased in the age of the household head has decreased the likelihood that the household was poor by 1%. As indicated by the estimated coefficient on the age of the household heads, the younger household heads are poorer than their older counterparts. The reason is that most of the sampled respondents are older household heads (with the average age of 41 years) and thus it resulted in a negative influence on the household's consumption poverty.

Marital status of the household head: At the 5% level of significance, the coefficient of marital status have negative statistical significant, which confirms with the hypothesis that the single parent families are more likely to be poor than two parent families. The likelihood of becoming poor decrease by 18% for married couples as compared to single parented households.

Education level of the household head: In order to escape out of poverty, education can play an important role. Education is also relatively expected to generate higher level of income and improve occupational and geographical mobility of labor. Therefore, in the formulation of poverty reduction strategy education serves as important factor. In this study the human capital variable shows significant determinants of the probability of a household being poor. The higher the education levels of the household head, the lower the household's probability of being poor. The results of the logit model indicate that levels of education variables categorized for this study are significantly impacted poverty situations. Particularly, in the study area as expected before, the household head education level (formal-schooling) has statistically significant negative coefficient at 5% level of significance. Moreover, the result of the logit model confirms that as the impact of education is in accordance with the descriptive analysis showing that higher level of the household head's education matters more in reducing the household's probability of being poor, having the marginal-effect value of 10%. In addition, the corresponding marginal-effects suggest one additional years of schooling will reduce the likelihood of being poverty by 10%. This the above result may be explained by the fact that education is expected to make the households more receptive to new technology, innovation and less conservative and hence consequently that will lead to lower the household's probability of being poor. However, an additional level of completing-lower 1ry (primary) schooling will raise the likelihood that a household was being in poverty by 20% at 5% level of significance.

Distance from road: This variable refers to the distance in hours from all-weather major truck roads from the household's residence. Then in this study the average distance of road are take as proxy to observe the effect of access to basic services in determining poverty. As it was expected, access to road has statistically significant negative coefficient at 5% level of significance. The negative coefficient indicates that as the distance from road increases its closeness to the market by 1 hour, the likelihood of the households being in poverty will be reduced in the study area. Holding other factors constant, the corresponding marginal-effects suggest that having access to all-weather major roads by one hour will reduce the likelihood of being in poverty by 1% in the study area.

Distance from market center: The coefficient of market distance is statistically significant at all conventional probability levels, which is contrary to the expected hypotheses. As indicated by MoFED (2002), the rural household's have better market chance if they are nearer to the towns and is found to have significant effect on household's poverty reduction. Holding other factors remains constant, the corresponding marginal-effects suggest as the market distance increases its closeness to the market approximately by1 hour, the likelihood of the farm households of being in poverty will reduced by 2%. The possible reason could be that the closer the residences of the households to the market center reduce the transaction cost of acquiring income in the area.

Livelihood strategies and by poverty status

Table 12: Frequency and percentage Statistics for sample respondent's Livelihood Strategies when HHs is categorized by poverty status; as poor &non-poor categories.

		Non-poor		Poor		Total	
	Categories	FRQ	Percent	frq	Percent	Frq	Percent
Livelihood Strategies	do not diversify	17	77.27	5	22.73	22	6.36
	Extensification	52	62.65	31	37.35	83	23.99
	Intensification	10	55.56	8	44.44	18	5.2
	Diversification	147	76.96	44	23.04	191	55.2
	Migration	21	65.63	11	34.38	32	9.25
	Total	247	71.39	99	28.61	346	100

Source: Author's Calculation based on the survey data, 2015.

Livelihood strategies on the above table 12 can be mainly categorized in to four distinct but related parts. The major categories are extensification, intensification, diversification and migration strategies. The finding for the households involvement in these livelihood strategies shows that involvement in livelihood diversification is the dominant one where55.2% of the households involve in it followed by extensification23.99%, migration 9.25%, and 5.2% in intensification strategies respectively, while 6.36% of the households are not involve in the above four livelihood strategies.

Regarding household's involvement, livelihood diversification strategy is found to be one of the major livelihood strategies in the area. The findings concerning to households poverty status among livelihood strategies indicates that there is a difference in the strategies adopted by the households.

As the statistics showing 44.44%, 37.35%, 34.38%, and 23.04% of the poor are engaged in intensification, extensification, migration and diversification livelihood strategies, while 22.73% of the poor are not diversify or not engaged in the above livelihood strategies. On the other hand, 76.96%, 65.63%, 62.65% and 55.56% of the non-poor are engaged in diversification, migration, extensification and intensification livelihood strategies respectively, while 77.27%, of the non-poor are not diversify or not engaged in any of the above four livelihood strategies. It implies that lower productivity of the land among the poor has driven them to engage in off and non-farm activities in order to diversify their source of income and hence may be to escape out of poverty.

4.3.2 Econometric Analysis of Determinants of Livelihood Strategies

In order to identify determinants of livelihood strategies, this section examines the correlates of these livelihood strategies using the MNL-model; based on the theoretical background and review of literature on related studies, to estimate the effect of hypothesized explanatory variables on household's choice of livelihood strategies and hence to assess the impact of livelihood strategies on poverty level or status of rural households of the study area.

Before undertaking model estimation, data was checked for its statistical diagnostic tests. As reported earlier the contingency coefficients for multicollinearity and association test among explanatory variables shown as there is no serious problem of multicollinearity among the independent variables. Similarly, robust standard errors were reported to avoid heteroskedasticity problem. Moreover, the model was run and tested for the validity of the independence of the irrelevant alternatives (IIA) assumptions by using Hausman test for IIA. The test failed to reject the null hypothesis of independence of the livelihood strategy options and suggesting that the MNL specification is appropriate to model rural households' livelihood strategy choice. The result of the maximum likelihood estimates values of coefficients, robust standard errors, their

marginal effects and statistical significance are shown in the table 13 below. As can be observed from the same table below, the value of Wald chi-square shows the goodness of fit for the fitted model. The likelihood test ratio statistics indicated by the chi-square statistics is highly significant suggesting strong explanatory power of the model.

Table 13: Multinomial logit model results of households' choice of livelihood strategies

	Extensification			Intensification			Diversification			Migration		
Variable	Coef.	Std. Err.	dy/dx	Coef.	Std. Err.	dy/dx	Coef.	Std. Err.	dy/dx	Coef.	Std. Err.	dy/dx
HH head sex(Female)	4.20**	1.78	0.16	-0.44	2.4	-0.02	1.91	1.50	-0.08	1.6	1.83	-0.03
Age of HH head	-0.28	0.26	-0.02	0.01	0.3	-0.01	0.37*	0.20	0.02	0.51**	0.24	0.01
HH head marital status	2.03	1.44	0.03	-0.98	1.4	-0.02	0.06	1.00	0.06	-0.7	1.14	-0.07
Number of children	0.76	1.16	0.05	0.86	1.7	0.03	-1.48	1.20	-0.09	-1.8	1.45	-0.04
HH family size	-0.22	1.00	-0.03	-0.57	1.2	-0.03	1.26	1.00	0.08	1.3	1.11	0.02
Dependency ratio	-1.08	0.93	-0.03	-0.23	1.4	0.001	0.04	0.90	0.04	-0.2	1.41	-0.02
Education Level of HH head	0.61	1.05	-0.01	0.14	1.1	-0.02	1.4	0.90	0.19	-0.2	1.1	-0.12
Size of land holding	-2.90***	0.8	0.03	-1.03	1	0.02	-15.02***	0.60	0.02	-15.97***	0.91	-0.13
Incidence of animal disease	-1.15	0.75	-0.04	-0.99	0.8	-0.02	0.62*	0.40	0.08	0.5	0.56	0.00
Livestock ownership in TLU	0.77	0.59	0.03	0.64	0.6	0.02	-0.72**	0.30	-0.08	-0.6	0.51	0.00
Distance from road	0.34***	0.13	0.01	-0.14	0.2	0.001	-0.06	0.10	0	-0.1	0.13	-0.01
Distance from Market center	-0.24***	0.04	-0.01	-0.15**	0.1	0.001	0.09**	0.001	0.02	0	0.05	0.00
Access to extension service	-0.24	0.58	-0.02	0.23	0.7	0.001	0.44	0.50	0.02	0.5	0.62	0.01
_cons	7.45	5.17		5.75	5.7		3.59	4.06		5.9	5.46	
Log pseudolikelihood = -291.35306							Wald $chi^2(63)$ = 0.0000***					
							Prob> chi^2= 0.0000***					
							Pseudo $R^2$0.3096					

Notes: Note: * Significant at10% level; ** Significant at 5% level; *** Significant at 1% level.

Source: Author's Calculation based on the survey data, 2015.

The MNL model result indicates that out of the total explanatory variables entered in to the model 7 variables including household headed sex (female), Age of the household head, land holding size (ha), incidence of animal disease, livestock ownership (TLU), distance from market center (in hours), and distance from road, were the significant determinants of livelihood diversification strategies at different level of significance (Table 13). However, for the four livelihood strategies the marginal effect of some significant variables is not similar. Some of the variables may be highly significant to affect the choice of a livelihood strategy and may be insignificant for the others. Therefore, the multinomial logit (MNL) analysis results show that the selection of each type of livelihood strategy is affected by different factors and at different levels of significance by the same factor.

In a specific way, the result shows that four, one, five and two (numbers of significant explanatory variables under the column's of each strategies) of hypothesized explanatory variables were found to significantly influence the choice to extensify, intensify, diversify and migration for temporary work strategies respectively (table 13). The marginal effects and reasonable or probable implications of the significant explanatory variables on the choice of the households' livelihood strategies are expressed as follows:

Household headed sex (female): As can be observed from the table 13 above, gender of the household head affects diversification options in the study. Specifically, as expected sex of the household head (female) is found to positively and significantly influence diversification into extensification activities at 5% significant level. Therefore, holding the influence of other factors constant, the marginal effect value indicates being female-head in a given household increase the likelihood that a household's choice of agricultural extensification livelihood strategy by 16% compared to being male headed household. Hence, to enhance their livelihood income through participating in this extensification activity helps to reduce poverty level/ status of their household members. The opposite is true for the male counterparts implying that the males are less likely to diversify their livelihood activities than their female counterparts. This result is consistent with Oluwatayo (2009) that stated the likelihood to diversify from farming is more associated with females than their male counterparts.

Age of the household head: As the model result indicate that the age of household head influenced positively and significantly the choice of diversification activities at less than 10% significance level. This study indicates that those farm households with old age are more likely diversify the livelihood strategies in to non-farm (diversification) activities, to enhance their livelihood income through this non-farm(diversification) activities in order to reduce poverty level/ status of their household members. However, this the study result opposes the prior expectation in that the older household heads participate less in non-farm activities and at old age

those household's farm experience and chances to maintain on-farm jobs increases with age. The reasonable probability for the positive association is that as age increases farm households have more chance to have more children, under which it help to available labor to engage in diverse activities. The increase in the number of the children in a farm household may result in more family members and this can create more demand for basic necessities of individual's is considered as the second reason. Hence, this condition may force a farm household to participate in diversified livelihood strategies in order to satisfy the basic needs of the family members. As the model result indicates in the above, holding other variables constant, the probability of a household choice of diversification activities is increased by 2% with a unit change in age. The result is consistent with similar studies of Dilruba and Roy (2012) and Ellis (2004) that explained as the household- head age is the main driving force towards livelihood diversification activities.

Similarly the model result also shown that the age of household head influence positively and significantly the choice of migration activities at 5% probability level. Keeping other variables remain constant, the marginal effect value showing the probability of a household's choice of migration activities increases by 1% with a unit change in age.

Land holding size of the household: As it was hypothesized, land holding size is significantly and negatively related to extensification, diversification and migration activities or livelihood diversification strategies equally at less than 1% level of significance. The negative coefficients indicated that the households with owning more land size are participated less in extensification, diversification and migration activities or livelihood diversification strategies and they instead participated more only on the on-farm livelihood strategy, to enhance their livelihood income through this on-farm activity in order to reduce poverty level/ status of their household members. Holding the other factors remain constant, the probability of household's livelihood diversification in to different options of livelihood diversification strategies or activities other than agriculture decrease extensification, diversificationand migration (for temporary work) livelihood diversification strategies by 3%, 2% and 13% respectively as the land holding size of the household increases by one hectare. Explaining contrarily, the possible reason can be a smaller amount of cultivated land holding size is not enough to the households to make a sufficient living from farm production alone, causing the households to look for supplementary non-farm / off-farm income generating activities in order to reduce the poverty status of the households. Similarly, Adugna (2008) and Fikru (2008) explained that the farm households with smaller cultivated land holding size participated in the off-farm diversification activities because of shortage of land to support their household family member's livelihood condition.

Incidence of animal disease: As can be seen in table 13 above, similarly to some of the variables, the coefficient of incidence of animal disease of the household's is positive and significant at 10% level for non-farm (diversification) strategy.

The corresponding marginal-effects suggest that as one additional level of incidence of animal disease of the household will increases the likelihood of the choice of non-farm/ off-farm (diversification) activities or strategy by 8%.

Livestock ownership in TLU: The study area farm household's livestock holding in TLU is negatively and significantly related to non-farm/ off-farm (diversification) activity or livelihood diversification strategy at 1% level of significance. Moreover, holding other factors remain constant, as the farm household's livestock numbers in TLU increases by one unit, the likelihood of their choice of livelihood diversification strategies decrease by 8%. Livestock are the source for generating cash income in the study area. Thus, the large livestock holding of the households creates better opportunity to gain more income from livestock production, and also it enhances the household's livelihood income through participating in the livestock production activity which helps to reduce poverty level/ status of their family members.

Therefore, in the study area, households who obtained the required amount of cash from livestock production may not want to participate in non / off-farm (diversification) activities for additional income, whereas farm households with lower livestock holding may be forced to diversify the livelihoods in to non / off-farm (diversification) activities to satisfy their family's basic needs through additional cash generated from the above stated strategy.

Market distance from the center: On the contrary to the hypothesis, market distance is negatively and significantly related to extensification at 1% probability level, is negatively and significantly related to intensification at 5% probability level and positively and significantly related to non / off-farm (diversification) activities or strategies at 5% probability level.

In the study area, holding other factors remain constant, as the market distance increases its closeness to the market by 1 hour, the likelihood of the farm household's involvement in to non /off-farm livelihood diversification strategies increase with 2% and, decrease for extensification and intensification strategies by 1% for both cases. The possible reason could be that the closer to the market center would reduce the transaction costs of acquiring agricultural inputs and profitably selling outputs and hence, good profits may attract them to depend on agricultural activity only. In the other hand, as the farm households located far from the market center the probability of farm households' involvement in to agricultural daily wage activities are highly to resolve liquidity problems is considered as the other reason. Furthermore, the closer to the market center may expose rural non-farm households to high competition from industrial-made substitute items which are sold in rural market centers which may forced rural households' to involve in to non/off-farm (diversification) activities, and this condition enhances the household's livelihood income through participating in this non/off-farm activities which helps to reduce poverty level/ status of their family members.

Distance from road: Distance from road is positively and significantly related to extensification at 1% probability level. Holding other factors remain constant, the positive coefficient shows that as the distance from road increases by 1 hour, the likelihood of the farm household's involvement in to extensification livelihood diversification strategies increase with 1%.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This thesis research has provided descriptive and econometrics analysis of determinants of household consumption-poverty and livelihood diversification among rural households in debatie Wereda, Benishangul Gumuz Regional State, Ethiopia using cross sectional data, by implementing binary logit and multinomial logit (MNL) models, focusing on demographic, human capital and socio-economic characteristics of rural farm households in the study area.

Descriptive statistics reveals, determining households' poverty status, based on level of Per-Capita Consumption-Expenditure (PCCE), confirm that while large number of households move out of poverty in the study period, many of them did not move far above the poverty-line and remained vulnerable to falling in to poverty. Furthermore, the descriptive statistics shows that about 29 percent of rural households appear to be trapped (existed) in poverty. In the study area majority (93.64%) of the sampled households are participated in different livelihood diversification strategies to increase their livelihood income. This indicates that in the study area, rural household's agricultural crop production and livestock rearing alone without participation in different livelihood diversification strategies is not enough to provide households income, in order to be being non-poor. On the contrary, the impact of non-participation of the rural farm household's in different livelihood strategies reduce those farm household's income that further leads to increase the poverty situation or status of the households in the study area.

In line with the descriptive results, the econometric regression results, also reveals that household heads' demography, education, socio-economic and Institutional characteristics are important determinants of Household's Consumption Poverty and livelihood diversification strategies in the study area. Binary logit model regressions confirm that households headed by female are most likely to be consumption poor. A household size in the household is significantly-positively associated with consumption poverty. Similarly, the dependency-ratio had negative impact on the level of consumption poverty, suggesting lower in consumption-expenditure of the rural poor to the households with a large share of dependents. Result of human-capital, indicates that education level of the households head is one of the strongest determining factors that affect poverty. However, the impact of poverty differs based on the level of education, with household head higher education level having the largest impact and household head completed lower primary education (i.e., 1-4 grade level) having the lowest impact on being out of poverty.

In general, the effect of human-capital on consumption poverty in the model is consistent with the other similar studies inferring that education is a key to reducing poverty and the assertion that increased years of education decrease the probability of being poor, showing the increasing returns to education as a whole. Regarding institutional factors both distance

from road and distance from market center influenced household's poverty status or level negatively and significantly.

In the study area, the MNL econometric analysis demonstrated that the rural farming households are likely to have diversified livelihood strategies; suggesting that different livelihood strategies are influenced or affected by different factors. The result of the study revealed that out of 13 hypothesized explanatory variables four, one, five and two variables were found to significantly influncechoice of extensification, intensification, diversification and migration, respectively are found to be significant up to less than 10% probability level. Accordingly, household headed sex (female), and distance from road were found to have positive association with livelihood strategies. At the same time, cultivated land ownership of the household, livestock owned by the household, and distance from market center of the household head negatively determine the choices of livelihood strategies.

5.2 Conclusion

The binary logit model result indicated that in the study area there is higher level of dependents in the households. Therefore, the household composition like age of the household head and dependency ratio in the household should be carefully analyzed with the household size. This is because many of the dependents are not working (many children and elderly) or they are being remunerated poor under which the totality leads to decline in the per capita consumption expenditure. In the area education is relatively expected to generate higher level of income. The higher the education levels of the household head, the lower the household's probability of being poor.

For the study area, policies that aim at reducing household-size, dependency-ratio, investing in education to enhance access to education, will exert positive effect on household's consumption-expenditure and thus reducing rural poverty in the study area. The reason is that demographic, human-capital, socio-economic characteristics of household heads' are important determinants of both rural poverty and livelihood diversification strategy categories; hence poverty reduction strategies and targeting will be more effective if they take these household's-characteristics in to consideration to support the poor and to tackle poverty incidence in the study area.

In the study area, in order to gain addition income, households who obtained the required amount of cash from livestock production may not want to participate in non / off-farm (diversification) activities, while farm households with lower livestock holding may be forced to diversify the livelihoods in to non / off-farm (diversification) activities to satisfy their family's basic needs through additional cash generated from the strategies stated above.

5.3 Recommendation

Family size was found to have positive correlation with poverty status of rural households and it is statistically significant at 1% level. Households with large family size and higher level of dependents in the households found difficult in securing the basic necessities of their family members. This indicates that those households which have higher family size and higher dependency ratio face the greater difficulty in improving the living condition of their family. The main reason behind is that, as the family size increase in each household it results in no means of accessing more land to cultivation to meet the demand of that large family size. Therefore, designing and implementation of projects/programs that work on family planning activities need to be encouraged in minimizing household size and in reducing number of dependents in the household to the level of household's income in order to address poverty related problems among the rural households in the study area.

The binary logit model result indicated that levels of education variables categorized for this study are significantly impacted poverty situations. In the study area, the household head education level (formal-schooling) has statistically significant negative coefficient at 5% level of significance. Moreover, the result of the logit model confirms that as the impact of education is in accordance with the descriptive analysis showing that higher level of the household head's education increases household heads income level and it matters more in reducing the household's probability of being poor. Therefore investment in education in the area need to be encouraged.

The result of the multinomial logit model indicated that in the study area farm household's livestock holding in TLU is negatively and significantly related to non-farm/ off-farm (diversification) activity or livelihood diversification strategy at 1% significance level. Rearing of livestock in the area is for dual purposes i.e. for sources of food and generation of cash income. Thus, the large livestock holding of the households creates better opportunity to gain higher level of income from livestock production, and also it enhances the household's livelihood income through participating in the livestock production activity. Therefore, it is advisable to provide sheep and goat credit and training the households to fatten their livestock's in order to increase the households income which helps to reduce poverty level/ status of their family members.

It would be advantageous or useful for policy makers to investigate the mechanisms through which those livelihood diversification strategies would be sustainable and to design policies that encourage livelihood diversification in the area, which could in the long run be combined with appropriate households income diversification mechanisms (increase in the HHs income through participation in different livelihood strategies) which further helps in order to reduce the impact

of poverty on the rural HHs of the study area, are recommendations drawn from the study conducted in the area.

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7. APPENDICES

Appendix I: Conversion factors used to compute adult- equivalent (AE)

Age range (Years)	Male	Female
0-1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1.14	0.86
18-30	1.04	0.80
30-60	1.00	0.82
60+	0.84	0.74

Source: Adopted from Dercon and Krishnan (1998)

Appendix II: Conversion factors used to estimate Tropical Livestock Unit (TLU)

Type of Livestock	TLU
Cow	1
Calve	0.25
Heifer	0.75
Bull	1
Goat	0.13
Mule	1.1
Sheep and Goat (Young)	0.06
Sheep	0.13
Ox	1
Horse	1.1
Donkey	0.7
Chicken	0.015

Source: Storck, et al. (1991)

Appendix III: Descriptive statistics of major variables when we categorize HHs by poverty status; as poor &non-poor categories.

Variable	Mean for non-poor	Mean for poor
HHs Per Capita Consumption Expenditure	1246.43	643.19
Log Per Capita Consumption Expenditure	7.07	6.45
Age of HH head	41.15	40.65
HH head age square	18.28	17.01
HH asset	6051.13	5929.80
Distance from road	4.92	5.90
Distance from market center	19.27	13.01
Number of children	1.25	2.27
Number of elders	0.09	0.00
HH family size	3.22	4.52
Dependency ratio	0.79	1.06
Total land cultivated	2.15	2.35
Incidence of animal disease	0.51	0.47
Livestock ownership in TLU	0.76	0.58
HH head sex (Male)	0.90	0.94
HH head marital status	0.81	0.84
Education level of HH head	0.26	0.18
Lower 1ry school completed HH head	0.21	0.14
Higher 1ry school completed HH head	0.03	0.02
2ry & above school completed HH head	0.02	0.02
Size of land holding	0.96	0.98
Farming system practiced	0.76	0.53
Access to credit	0.31	0.23
Access to extension	0.42	0.38
HH Income from off-farm activity	0.35	0.25

Source: Author's Calculation based on the survey data, 2015.

Appendix IV: Survey Questionnaire
Household Questionnaire Format

Introduction: For enumerator: Hello how are you? My name is ----------.
This interview is the main body of the survey conducted on the consumption poverty and livelihood diversification among the rural households of Debatie wereda .This research is mainly in partial fulfillment for Msc Degree in Development Economics at Adama Science and Technology University. We are interviewing many households in the wereda. Most of the questions have to do with your attitudes. The study concentrates mainly to analyze the determinants of consumption poverty and to assess the impact of the different livelihood diversification strategies exercised by household's on poverty status in the study area and thereby to give valuable information to decision makers and concerned bodies. This helps to facilitate appropriate planning in the development intervention and poverty alleviation programmers. As a result, I hope you and your surrounding societies will be beneficiaries from this research in the future time. Your precise response will be used for this purpose only within the knowledge of the researcher and not for any other purpose. Thus your opinion is very important in this regard, there is no wrong or right answer. It is completely confidential that your name will never be associated with your answers and I will kindly request your correct answer, so that the research will show realistic results. This interview will take a few minutes.

Interview area identification
1. Wereda _____
2. Name of the kebele _____
3. Name of data collector _____
4. Name of supervisor _____
5. Interview date _____
6. Signature _____

1. Information of HHD family members

01	02	03	04	05	06	07	08	09
Serial No	Name of HH members	Sex	Age	Education Level	Relationship with the HHD	Ethnic	Religion	Marital status
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Codes

Codes for 07: 1= Oromo 2= Gumuz 3= Shinasha 4= Amhara 5= Others (specify)_____

Codes for 08:1= Christian 2= Muslim 3=Others (specify)_____

Codes for 09:1= Never Married 2=Married 3=Divorced 4 =Widowed

2. HOUSEHOLD ASSET OWNERSHIP.

2.1 What types of items are owned by your HH members currently?

1. Mobile 2.Television 3.Radio 4.sleeping bed (Metal/Wooden)

4. Others (specify)_____

2.2 Do you have your own private house? 1. Yes____ 2. No ____

2.3 If the answer is No (for Q.2.2), where do get shelter? _____

3. RURAL HHD MEANS OF LIVELIHOOD AND LIVELIHOOD BASE SITUATION.

3.1. In what type of employment status situation do you involve? _____

1. Employer 2.Employee 3.Unpaid family labor 4.Self employed

5. Others (specify) _____

3.2 In what type of main current occupation do you involve?_____

1. Farmer (only crop) 2. Livestock rearing 3. Mixed farming (crop and livestock) 5. Others (specify) _____

3.3 Within the study period do you or your HHD family member participated in other activities that are different from the main livelihood means? 1. Yes____ 2. No ____

3.4 If the answer is Yes, in which types of activities stated below: (Multiple answers are possible)

1. Livelihood extensification strategies ____ 2. Livelihood intensification strategies ____

3. Livelihood Diversification strategies ____ 4. Migration____

3.5 As the HH head do you think there is shortage of cultivated land? 1. Yes_____

2. No _____

3.6 Do your family members (for those whose age is 15 year and above and below 65 years), have been involved in productive labor (works) in the year 2014/15?

1. Yes _____ 2. No _____

3.7 As the HHD head, do you think that for those of your family members whose age are in the active labor force group (for those whose age are between 15-64 years) could obtain their own land for agricultural purpose? 1. Yes ____ 2. No ____

3.8 Do you think that your total farm land is enough to support your family's consumption?

1. Yes_____ 2. No _____

3.9 If the answer is No, what are reasons for that the total farm land is not enough to cover your family's consumption (Multiple answers are possible)

1. Shortage of agricultural inputs to raise productivity

2. Family size increment 3. Others (specify)_____

3.10 What amount of total farm land size do you own? _____ in hectare or local units.

3.11 In 2014/15 What amount of total farm land you cultivated? It is _____ in hectare.

1. Privately owned _____ 2.On the basis of crop shared_____

3. Others (specify) _____

3.12 As the HH head do you participate in livestock rearing? 1. Yes____ 2. No____

3.13 If the answer is yes, mention their number.

Livestock type	Total Number
Cattle (including mothers and young animals)	
Ox	
Sheep (including young animals)	
Goat (including young animals)	
Mule	
Donkey	
Chicken	
Beehive	
Others	

4. HHD FARMING SYSTEM PRACTICED

4.1 To increase production and productivity, do you use modern agricultural inputs?

1. Yes _____ 2. No _____

If the answer is yes, which one? 1. Pesticides 2. Selected/Improved seeds 3. Fertilizer

4. Others (specify) _____

4.2 What is the type of drought power source you use? 1. Oxen 2. Own labor

3. Others (specify) _____

4.3 The type of land cultivation you use usually is _____

1. Repeatedly use of the farm land for cultivation from time to time. 2. Shifting cultivation

3. Others (specify) _____

4.4 If you do not use oxen plough for farming system, what types of tools you use for farming system? Please, state them _____

5. HHD INCOME

5.1 How much is the total amount of your annual income from all types of sources within the study period_____ (in birr)?

5.2 From the total amount of income above (Q.5.1) State the type of work and the portion of annual income that you gain in the year 2014/15, rather than income that you gain from the sales of Agriculture and livestock products.

Description of Activities	Annual income(in Birr)
Sales of labor in non-farm activities	
Sales of agricultural farm tools(income from off farm activities)	
Gold mining	
Sales of labor in Agriculture	
Rent of animals	
Sales of fire wood,charcoal	
Income from carpenter activity	
Trade	
Others	

6. CONSUMPTION AND EXPENDITURE OF HHDs.

6.1 As the HH head depending on the previous one year's consumption would you tell me the types of food items used in your family? Mention the quantity of each item and the value for one year period.

Types of food items	HHs consumption within the study period			
	Unit	Quantity	Value(Birr)	Remark
Teff	Kg			
Maize	Kg			
Sorgum	Kg			
Soyabean	Kg			
Milet	Kg			
Vegetables	Kg			
Wheat	Kg			
Milk	Liter			
Meat	Kg			
Sugar	Kg			
Salt	Kg			
Butter	Kg			
Oil	Liter			
Others				

6.2 What are the food sources for your family consumption?

1. Purchased Food items 2.From own production 3. Others (specify)_____

6.3 For the year 2014/15, what were the quantity and type of food you produced or got from crop Production and livestock you have for your household's consumption?

6.3.1 HHD Crop Produced

Types of food items	Amount produced during the study period			
	Unit	Quantity	Value(Birr)	Remark
Teff	Kg			
Maize	Kg			
Sorgum	Kg			
Soyabean	Kg			
Milet	Kg			
Ladies Finger	Kg			
Wheat	Kg			
Seasame	Kg			
Noog Abyssinia	Kg			
Ground-nut	Kg			
Vegetables and Fruit	Kg			
Others(specify)				

6.3.2 From livestock sources:

Food items types	Amount produced during the study period			
	Unit	Quantity	Value(Birr)	Remark
Milk from cow	Liter			
Meat	kg			
Butter	Kg			
Meat from Chicken	Kg			
Egg	No			
Honey	Kg			
Skin and Hides	No			
Others				

6.4 Do you and your family members face a food shortage during the study period?

1. Yes_____ 2.No_____

6.5 If yes, how did you and your family members overcome the food deficit happened? _____

1. Income from non-farm activities 2. . Income from off-farm activities

1. By purchased food items 2. By cash obtained from Sales of animals

5. Others (specify) _____

6.6 In 2014/15 for the HHs family member's consumption what were the quantity and type of food you purchased?

Food items types	Amount of food items purchased during the study period			
	Unit	Quantity	Value(Birr)	Remark
Teff	Kg			
Maize	Kg			
Sorgum	Kg			
Milet	Kg			
Wheat	Kg			
Meat	Kg			
Butter	Kg			
Milk	Liter			
Edible Oil	Liter			
Sugar	Kg			
Salt	Kg			
Tea leaf	kg			
Spices	Various			
Others(specify)				

6.7 In the year 2014/15 indicate the total amount of expenditures incurred for your family on various food and non-food items used?

Items	Annual Expenditures(in Birr)
Closing	
Health care(Medical)	
School fee	
Food	
Purchase of animals	
Religious contributions	
Tobacco and chat	
Transportation cost	
Social, public and tax contribution	
Utensils of the house	
Social obligations(marriage ,etc)	
Veterinary services	
Lamp fuel	
Others(miscellaneous)	

7. HHD MARKETING AND CREDIT

7.1 Do you and your family members go to distance area to trade with others? 1. Yes_____ 2. No _____

7.2 Is there a nearby market to your village? 1. Yes_____ 2.No _____

7.3 If yes, do you think that this market place serve for exchange of all types of agricultural products and livestock? 1. Yes_____ 2. No _____

7.4 In 2014/15 or before that do you receive any type of credit facility? 1. Yes___ 2.No___

7.5 If yes, where do you get credit facility?

1. Banks 2 Microfinance Institutions (government owned) 3.From merchants

4. Others (specify)_____

7.6 How far is the market for food and non food items from your village?_____ in hours traveled.

8. HHD ACCESS TO EDUCATION, HUMAN HEALTH, WATER AND SANITATION

8.1 Is there any school service for your family members? 1. Yes_____ 2. No _____

8.2 Is there a nearby human health facilities in your area? 1. Yes _____ 2.No _____

8.3 How far do you travel to get the health services institutions? _____ in hours.

8.4 From your village how far you travel to fetch safe water? _____ in hours.

9. HHD'S ACCESS TO SERVICES

9.1 How far do you travel to get to the nearest school in your area? _____ in hours.

9.2 How far do you travel to get the nearest services of all weather roads? _____ in hours.

9.3 How far do you travel to get telephone services? _____ in hours.

9.4 How far do you travel to get grain mill services? _____ in hours.

9.5 In the year 2014/15 does your household get extension services from any government organization or other institutions? 1. Yes _____ 2.No _____

9.6 In 2014/15 has development agent visited your farm area? 1. Yes _____ 2.No _____

10. HEALTH SITUATION OF ANIMALS IN THE AREA.

10.1 Is your livestock has been infected by animal disease during the study period?

1. Yes_____ 2.No _____

10.2 If the answer is yes, how many times your livestock has been infected by animal disease during the study period? _____ in number.

10.3 Who provides the health facility services for your animals?

1. MOA 2.Private 3. Others (specify)_____

THANK YOU.