THE IMPACT OF RURAL LIVELIHOOD DIVERSIFICATION ON HOUSEHOLD'S POVERTY STATUS IN JIMMA ZONE, OROMIANATIONALREGIONALSTATE, SOUTHWEST ETHIOPIA

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The Impact of RuralLivelihood Diversification on Household's PovertyStatus in Jimma Zone, Oromia National Regional State, Southwest Ethiopia

By

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DEDICATIONS

I dedicate this thesis manuscript to my mother: **WESENE WEYSA** and my father **ABEBE HABTIYMER** for the foundation they laid in the success of my life.

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The author was born in Gore woreda, Illuabaabora zone,SouthwestEthiopia in 1976 EC. She completed her primary school in Gore primary and junior secondary school and attended her high school education at Matu secondary school. In 1988 EC she joined Bale farmers training center (now Agarfa ATVET College) in the field of home-economics and graduated by certificate program in August 1989 EC. In 1996 EC she was employed being as Development Agents in Gambella Regional State. In 1997 she joined Gambella ATVET college diploma program in the field of Animal sciences and graduated in 2000EC. After her graduation she worked in Gambellaworeda for one year being as animal production expert and to quench academic thrust she joined Haramaya University for her BSc degree in Rural Development and agricultural extension and graduated in January 2004EC. Soon after her graduation, she joined GambellaAgricultural Research Institute(GAIR) as Assistant Researcher in the department of Socio Economics and Agricultural Extension until she joined JimmaUniversity to peruse her master's degree in Rural Development and Agricultural Extension in October, 2010EC.

STATEMENT OF THE AUTHORS

First, I declare that this thesis is the result of my own work and that all sources or materialsused for this thesis have been duly acknowledged. This thesis is submitted in partialfulfillment of the requirements for an advanced M.Sc. degree at JimmaUniversity and tobe made available at the University's Library under the rules of the Library.I confidentlydeclare that this thesis has not been submitted to any other institutions anywhere for the awardof any academic degree, diploma, or certificate.

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ABBREVIATION AND ACRONYMS

ATT	Average Treatment
AE	Adult Equivalent
CSA	Central Statics Agency
CBD	Coffee Bleb Disease
CSD	Coffee Seed Disease
DIFD	Department International for Development
EHNRI	Ethiopian Health Nutrition Research Institution
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FEHH	Female Household Headed
FGD	Focus Group Discussion
FGT	Foster Greer Thorbecke
GDP	Gross Domestic Product
HH	Household Head
HICE	Household Income and Consumption Expenditure
IDS	International Development Since
IFAD	International Fund for Agricultural Development
IFAD	International Food Agency Development
Kcal	Kilocalories
Kg	Kilogram
Km	Kilometer
Lt	Liter
m.a.s.l	meter above sea level
MHH	MaleHousehold Headed
MOA	Ministry of Agriculture
MoFED	Ministry of Finance Economic Development
NFS	Nonfarm Share
NN	Nearest Neighbor
NR	Natural Resources
OCSSCO	Oromia Credit and Saving Share Company
PPS	Proportion to Population Size
PPP	Purchasing Power Parity
PRA	Participatory Rural Appraisal
PSM	Propensity Scores Matching
SE	Score Estimation
SD	Standard Deviation
SLF	Sustainable Livelihood Framework
SPSS	Statistical Package for Social Science
SSA	Sub Sahara Africa
TLU	Tropical Livestock Unit
UN	United Nation
USD	United State Dollar
UNDP	United Nation Development Programme
VIF	Variance Inflation Factors
WIC	Walta Information Center

ABSTRACT

In Ethiopia agriculture is the principal source of food and livelihood for many rural households making it a central component of programs that seek to reduce poverty and attain food security. Since the sector is facing many challenges, rural households are compelled to develop livelihood diversification strategies.The aim of this research is to assess the determinant of rural livelihood diversification and itsimpact on household poverty inJimma ZoneOromia regional stateEthiopia.A multistage sampling procedure was employed to select 385 sample household heads.Primary and secondary data were collected from two purposively selected woredasby usinginterview schdualed, key informant interview,focus group discussion and personal observation.Both descriptive and inferential data analysis methods were applied.Cost of basic need approachwere applied to measure poverty status. The result of the study indicated that 37.14% and 62.86% werefound to be poor and non poor respectively.The results of descriptive statistics also indicated as age of household, dependency ratio, year of schooling, sex of household, livestock ownership, land holding, nonfarm income,market distance and extension contact were found to have significant influence of household on poverty status atthe different probability level.Similarly, the descriptive statisticsshows thatage of household, family size,year of schooling ,sex ofhousehold, credit services,off and nonfarm income, land holding andlivestock wnershipwere found to have significant influence the status diversified sample household .The result of binary logistic regression model indicated as family size, land holding, livestock ownership, year of schooling, access to credit services and off farm income of the households were found to have significantly determining livelihood diversification.Moreover, over the resultof propensity score matching indicate as household participation on livelihood diversification has a positive and significant impact on the household poverty. Accordingly,households with diversified livelihood were found to be 9% better than those non diversified in terms of poverty.In general householdswho diversified their activities were found to be able to build better asset than the non diversified.Therefore,government attention should be given forsupporting the livelihood diversification effort through creating enabling environment for farmer especially for the poor.

Keywords:*Impact, Livelihood Diversification, Poverty, Binary Logit, Ethiopia,PSM*

1. INTRODUCTION

1.1. Background of the Study

Agriculture isan important sector for majority of the rural populationlivelihood in developing countries. It has been the predominant activity for most rural households in Sub-Saharan Africa (SSA) which is offers a strong option for spurring growth, overcoming poverty, and enhancing food security (World Bank, 2008). However, subsistence producers and small farm wage laborers in the rural areas of low income countries constitute over two thirds of the global poor and food insecure populations and about 70 percent of the world's very poor people are living in rural area (IFAD, 2010; IFAD, 2011,FAO *et al*., 2014).In addition, to these the subsistence farmers tackle various structural and transitory environmental and institutional stresses and shocks that frequently make them vulnerable to falling below subsistence thresholds (Harvey *et al*., 2014).

Different scholars are arguable most significant gains in global poverty reduction can be achieved by interventions targeted at rural livelihoods to address these vulnerabilities. The understanding of local livelihood context, the sources and nature of risks and the coping behavior of the communities and their efficiencies is important for the success of antipoverty policies because vulnerability is highly contextual to political, social, economic and historical realities of specific places (O'Brien *et al.*, 2009).In addition many countries have different development possibilitiesthe influential factors of poverty level are not only economical, but also social, political, cultural, geographical factors (Spaho, 2014).

Additionally, most of rural populations have been suffering from poverty and environmental degradation. Poverty in Ethiopia is highly correlated with the size and composition of households, the educational level of household head, the degree and extent of dependency within the household, asset ownership(particularly ownership of oxen in rural areas), the occupation of household heads, rapid population growth, major health problems, lack of infrastructure and extreme environmental degradation (MoFED, 2012).Maintenance of a diversified resource base is a prerequisite for adaptation to climate variability as diversified livelihood systems allow indigenous farming communities to draw on various sources of food

and income (Macchi*et al*, 2008).Poverty although a multi-dimensional issue, it is directly associated with a household's income asset holding, and other economic aspect, the problem also affecting every nation of the world. The reduction of poverty is the most difficult challenge facing any country in the developing world where on average because of the majority of the population is considered poor (Chen and Ravallion, 2010). There for need to understand livelihood-poverty links that recognize heterogeneity at community and household level to achieve sustainability goals (Poole *et al*. 2007).

In Ethiopia agriculture serves as the primary means of rural households' livelihood, which contributes 45% GDP, more than 86% of employment opportunities and over 90% of the foreign exchange earnings of the country (MoA, 2010).However, farming as a primary source of income has become failed to guarantee sufficient livelihood for most rural households (Babatunde, 2013).The majority of rural household cultivating less than 0.5ha and producing mostly basic staples for the subsistence of their households (Bazezew*et al*, 2013). In view of this dependency on agriculture and the associated level of rural poverty, investigations in to the nature of livelihood diversification also clearly reflect the desire to understand better whether promoting diversification offers potential for livelihood enhancement and poverty reduction (Deiniger and Okid, 2010).

Similarly, Ethiopian poor to survive tend to diversify in the form of daily wage laborer, and to mitigate production risk of rain fed agriculture, choose low risk but low return crops which contribute to poverty trap (World Bank 2005) Furthermore, Reta and Ali (2012) indicated that in rural Ethiopia if there had not been other sources of income apart from agricultural production, the land scarc by the farmers coupled with agricultural risks could not generate enough income to feed household members and they cannot fulfill household needs this suggests that the necessityof non/off-farm diversification in rural Ethiopia.Additionally, livelihood diversification is believed to be a solution, and an effective strategy for the reduction of poverty and food insecurity in rural Ethiopia (Yenesew*et al.*, 2015).

Then,expectation that achieving the goal of reducing poverty only through increasing agricultural productivity and redressing the issues of access to key agricultural resources without non/off-farm livelihood diversification could not be successful in the rural area (Emanuel, 2011).For this reasons, there is a strong consensus that any development

intervention to improve the livelihood and food security situation of the rural poor need to take agriculture along with the non/off-farm livelihood diversification, without excessive preference being given to farming as the unique solution to rural poverty.

Jimma zone is one of the major coffee growing areas of Oromia region well-endowed with natural resources contributing significantly to the national economy of the country. Major crops grown other thancoffee,cereal, pulsesroot andtuber, vegetable and fruits, Honey production are other sources of cash after coffee. Enset is a strategic crop substantially contributing to the food security of the zone and is especially important in highlands woredas. In the study area with high biodiversity, large tracts of Afromontane forests and home to the wild gene pool of Arabica coffee (*Coffee arabica*), which generates the largest foreign exchange for the country (FAO 2016).

Though the problem is serious but the resources is available then, demands a good understanding, studies conducted on the livelihood diversification and their relation with regard to poverty situation in the woreda levels. Also there was in this area concerning the question of what is the impact of livelihood diversification in household poverty is a number of quite essential and critical questions which are relevant in understanding the situation and for policy making remained unanswered. Therefore, this study has attempted to answer the underlying question whether livelihood diversicatoin activity influences the overall household income inequality in rural areas with special reference to farming households in tudy area of Jimma zone .

1.2. Statement of the problem

Currentlythe contribution of livelihood activities and migration to the overall incomes of rural households and itis increasing and cover about 50% of household income(Davis *et al.*, 2017),However whether diversification of rural livelihoodswill provide impetus for improving living standards of developing counties like Ethiopia is still a subject of much debate (World Bank, 2007) Because of primary dependence on subsistence crop production, harvest failure leads to household food deficits, which in the absence of off/non-farm income (Government of Ethiopia, 2009).Similarly, Ethiopia is among the low-income countries in the world with GDP per capita of $1608 in Purchasing Power Parity (PPP) terms in 2017 and ranked 164 out

of 187 countries (World Bank, 2017).Real purchasingpower of the earlier$1.25 linein poor countries. Using the 2011 PPPs, the new line equals $1.90 per person per day (Francisco H. G. Ferreira, 2015). It is obvious that it is hardly possible to use poverty assessment results carried out elsewhere in the country for other areas due to the fact that the country is differentiated with diverse socio-economic settings, and agro-ecological zones.

There are several studies conducted in Ethiopia on the importanceand determinant factors of livelihood diversification.The studies consider a variety of household characteristics such as age, gender, farm size and educational level, along with other environmental characteristics such as credit access, distance to the nearby market and location. (Kejela *et al.*2005, Van Den Berg &Kumbi, 2006 ,Beyene, 2008, Bezabih,*etal*, 2010; Bezu& Barrett, 2010, Sisay, 2010, Yishak*et.al* 2014).However these studiesassessingthe status oflivelihood income from different off/nonfarm activities in the rural householdand factor determinants of livelihood diversification by providing a lot of compelling and insightful results and to comprise the linkage between despite the inseparable and practical links between livelihood diversification.

Most of the previous study has focused on addressing the determinant of the livelihood diversification of rural household is individual benefit and region specification. Limited studies were conducted on factors affecting off-farm income diversification and its effects on rural household poverty and the effect of livelihood diversification on household income in Ethiopia for example, (Eshetu and Mekonnen 2016,Gebreyesus, 2016).But there has been no significant systematically conducted on marginal areas in Jimma zone. Whileonly the study conducted rural household vulnerability to poverty Sokoru and TiroAfetaworeda of Jimma zone measure the extent of vulnerability to poverty as well the effect of socio-economic characteristics on household susceptibility to poverty (Sisay*et.al,* 2016). The study in some extent the researchers believed that the adoption of innovative and appropriate onward looking anti-poverty perspectives but not address improving the well-being of household through livelihood diversification development preventing people from becoming poor.Though useful, such study does not capture the dynamic nature of livelihood strategies in the context of poverty reduction in the rural household of the study area.

Considering the limited analysis of previous studies and to fill the gap and addressing this problemthe best of the researcher knowledge on top of the exiting literature livelihood

diversification and it is to give reach to this conclusion. Thereforethis study is attempted toprovide empirical evidence on the links between livelihood strategies and poverty to assess the sources of assetswhich rural households possess, identify the different livelihood strategies and activities and determine the factors that selection of existing livelihood strategies.Therefore assessing the status livelihood diversification tried to critically evaluate the impact of livelihood diversification on rural household poverty in the study area of Jimma zone.

1.3 Objectives of the Study

1.3.1 The general objective of the study

The general objective is to assess the impact of rural livelihood diversification on household poverty status in Jimma zone south west Ethiopia .

1.3.2 The specific objectives of the study

- To assessthe status of rural household livelihood diversificationin the study area.
- To analyzemajor determinants of livelihood diversification strategies at household level in thestudy area.
- Toidentfied the impacts of livelihood diversification on rural household of poverty status in the study area.

1.4 Research Question

1. What is the status of rural household livelihood diversification in the study area?
2. What are the major determinants of rural household livelihood diversification in the area?
3. What is the impact of livelihood diversification on household povertystatus in the study area?

1.5. Significance of the Study

Livelihood diversification is believed to be a solution and an effective strategy for the poverty reduction and food insecurity in ruralEthiopia.This study contribute to a consistent and better understanding on the sustainable rural livelihoods to support development policy tools aimed at targeted interventions recognizing rural household heterogeneities.The outcome of the study is expected to provide valuable information for designing development intervention by policy makers and development institutions working in the area of improving livelihood of rural poor household. Moreover, these a good right can be developed on rural livelihood diversification and knowledge can be used as a valuable ingredient to other similar areas having similar situations havebeen made ready and documentedit will serve as source material.The finding should be utilized by planners contribute to a consistent and better understanding on the sustainable rural livelihoods to support development policy tools aimed at targeted interventions recognizing rural household .

1.6. Scope and Limitation of the Study

The study was undertakenbased on the sustainable livelihood framework perspective of different livelihood strategies in rural household and specifically to identify the major determinant of livelihood diversification and its impacts of household poverty of Jimma Zone.The study utilizes cross sectional data because of absence baseline of data on the impact evaluation on household's poverty which means observation of different household at a given period of time and due to limited time and resource the data were collected from sample households of two purposively selected rural woredas hence it is representative of the whole population ofJimma zone and carried out by surveying a sample of only 385 respondents.

In addition, during data collection the cost and incomes level are based on self-reported estimates by households and due to the fact that worrying the taxes and other development contributions are distributed among them based on these factors which are liable to recall bias cost and income.On the other hand the determinants of livelihood diversification, decisions made within the household context vary of individuals and family structures. Therefore the interview focus on the household head, inevitably leaves out other possible determinants and

motivations for diversification such as structural, social or cultural constraints on other adult members in the household who are not household heads.

Finally, the studies carried out in many countries have pointed out that rural household lacks willingness give to accurate information on the variables such as sources of income, farm sizeand financial deposit/ amount of saving is the major negative impact capturing of rural household's to identified their statues resources .This study may not be grated from these limitations. But to mitigate this problem as much as possible it was tried to convinceduring data collection it was household head individually and cooperatively about the objectives of the study.

1.7 Organization of the thesis

This thesis is organized in five chapters whereby the first chapter discusses about research background, statement of the problem, research objective significance and scope and limitation of the study in the preceding chapter one part. The second part deals with literature review theoretical and conceptual framework of rural livelihood strategies and diversification on household poverty and empirical studies made in the different countries including Ethiopia. The third part presents the brief description of the study area and methodology employed in data collection and analysis. In fourth part the thesis deals with the results and discussion of the research. Finally, part five summaries of findings, conclusions and recommendations based on the findings of this research.

2. LITERATUREREVIEW

2.1Basic Concept and Definition

The most generally quoted definition of **livelihoods** is that given by Carney (1998) based on the work of Robert (Chambers and Gordon Conway 1992).A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the futurewhile not undermining the natural resource base. The concept of livelihood is widely used in contemporary on poverty and rural development.

Diversification: refers to income strategies of rural households in which households increase their number of economic activities regardless of the sector or location (Start, 2001).A household can have multiple livelihoods, even though each member is specializing in one activity. Income diversificationrefers to the increase in the number of economic activities (farm and/or nonfarm) at a given point in time (Ellis, 1998).

Livelihood diversification: is anactive social process of individual or household diversification, involving the maintenance and continuous adaptation of a highly diverse portfolio of activities (farm and/or nonfarm) (Ellis, 1998). Very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their assets in just one activity which makes diversification the norm (Barrett *et al.,* 2005). Livelihood diversification can be seen as an attempt by individuals and households to find new ways to raise incomes and reduce environmental risk (Haggablade *et al.,* 2007).This approach offers an explanation for household diversification based on access to assets, which are used as part of the household income generating strategies (Velazco and Pinilla, 2013).

Rural livelihood diversification: on the other hand is defined as the pursuit of any on farm and off/non-farm income-earning activity.This definition includes, any form of trading occupation (e.g., selling crop and livestock product live animals, or other products), wage employment, working as a hired herder, farm worker, and migrant laborer, retail shop activities,rental property ownership and sales, gathering and selling wild products like (gum Arabica, firewood, charcoal or medicinal plants) (Little *et al*, 2006).

The literatures show the reasons behind livelihood diversification are many.Ellis (2000) stated that livelihood diversification is pursued for a mixture of motivations and these vary according to context: from a desire to accumulate, invest and the need to minimize risk or maintain incomes, to a requirement to adapt to survive in eroding circumstances or some combination of these further notes that households diversify by adopting a range of farm, non-farm, and off-farm activities that generate income divided the motives behind livelihood diversification into two(push and pull factors).The pull factor is diversification undertaken for asset accumulation, whereas push factors is diversification undertaken to reduce vulnerability and build resilience to shocks (Abdul Malek and Usamin, 2010).

Households may diversify through the production of other agricultural and non-agricultural goods and services, sale of waged labour, or self-employment in addition to other strategies undertaken to spread risk. Income derived from farm livelihoods comprise both consumption-in-kind of own farm output and cash income from output sold. It also includes labour payments in kind, such as the harvest share systems and other non-wage labour. Non-farm income refers to non-agricultural income sources such as non-farm rural wage to-rural remittances arising from within national boundaries, and international remittances arising from cross-border and overseas migration (Barrett *et al*., 2001)

Poverty: Different scholar's defined as; Encarta (2009) emphasized that poverty is a condition of having insufficient resources or income and can also be defined as the state of one who lacks a certain amount of material possessions or money. Poverty refers to a state of severe deprivation of some basic human needs at the individual or household level (Aliyu, 2003). As of World Bank (2005), poverty is defined as a deprivation in well-being, and encompasses many dimensions. It besides the inability to acquire the basic goods and services, consists of low levels of health and education, poor access to clean water and sanitation, inadequate physical security, voicelessness, and insufficient capacity and opportunity to better one's life.Poverty is not an easy concept to define describing, the ''poor" vary in accordance with the perspective and objective of those doing the defining (Korsi*et al.*, 2001).

Absolute poverty: defined as when household income is below a certain level, which makes it impossible for the person or family to meet basic needs of life including food, shelter, safe drinking water, and education, healthcare.

Relative poverty:defined as when households receive 50% less than average household incomes, so they do have some money but still not enough money to afford anything above the basics. This type of poverty is, on the other hand, changeable depending on the economic growth of the country.

Impact evaluation:impact evaluation refers toassesses the changes that can be attributed to a particular intervention, such as a project, program or policy, it helps people answer key questions for evidence-based policy making both the intended ones, as well as ideally the unintended ones which examines whether targets have been achieved, how would outcomes such as participants' well-being have changed if the intervention had not been undertakenit also seek to answer cause-and-effect questions. In other words, they look for the changes in outcome that are directly attributable to a program. (Bank world 2017)

2.1.1 Theories of livelihood diversification

Several theories have been proposed to explain the concept of livelihood diversification. The theories explain why rural households diversify their livelihoods .First is the **Boserupian theory** of population and economic development (Boserup,1965).Boserupian theory challenged the **Multhusian theory** that predicted the extermination of humans due to population increase beyond the carrying capacity .

Multhus had proposed that an increase in human population over the land's carrying capacity would lead to the elimination of the excess population either by direct starvation or by other positive checks which can be traced back to the insufficiency of food supplies .Further, sustained growth of total population and total output in a given territorywould have secondary effects which would set off a process of economic growth, with rising output per man-hour, first in the non-agricultural activities and later in agriculture.

Additionally, an increase in human population and establishment of permanent settlements would lead to the development of non-agricultural activities as a result of emergence of a social framework within which professional artisans and traders would develop a more lasting and specialized activity.Davies (1996) supports this theory and posits that as food stress due

to population pressure on natural resources, increasing competition for natural resources pressure on dry season grazing and increased dependence on markets sets in livelihood diversification becomes a strategy to ensure survival.

Secondly the theory of structural transformation of economies argues that diversification of rural employment is part of a positive dynamic whereby economic growth entails a shift in employment from agriculture to industry and then to services (Timmer, 2009 and Binswanger*et al*., 2010). However, this theory has been challenged by some economists who argue that livelihood diversification is generally a form of adaptation that remains essentially negative.

Similarly, others economists have argued that livelihood diversification is a survival strategy in the context of stress (Ghosh and Bharadwarg, 1992, citedNjuguna, 2015,). The stress conditions could be population pressure, drought, poorly performing agriculture among others which cannot enable the households to build sustainable livelihoods, hence the households diversify their livelihoods simply to survive rather than to improve livelihoods and invest in production (Jiggins, 1986; 1989, Davies, 1996). Questioned whether a poor household would ever be able to generate enough assets and labour to run a farm and whether it would be better for them to focus their efforts on a specific niche activity such as trade, market gardening or firewood collection.

Finally, Ellis and Freeman (2004)pointed out based on two arguable theory of livelihood diversification in the process of improving livelihood and reducing poverty. They argued that farm households diversify their livelihood because of asset-based and insurance-based diversification theories. **Asset-based** diversification theories argue that the degree and level of diversity in a farm household's income mix indicates the extent of diversity in the resources or assets it owns or has access to it. **Insurance-based** diversification theory argues that income failures and shocks dictate and push the farm household to diversify its activities.

2.1.2 Multidimensionality of poverty

The idea of multidimensionality of poverty has become quite common place among both academics and practitioners dealing with poverty, it has both income and non-income

dimensions of deprivation. The latter is supposed to include deprivation of such tangible assets as land, savings and housing, as well as such non-tangible assets as health, education dignity and security, poverty has multi faces as a denial of human rights (UNICEF, 2000). Poverty in its multidimensional facet, (World Bank 2003) associates it with insufficient outcomes and deficient social relationssuch multifaceted phenomenon that what is perceived as poor in one society may differ from the other based on the socioeconomic, cultural and political situation of a particular society.

2.1.2.1 Relative poverty line

From this perspective, a person is considered poor when they are in a clearly disadvantaged situation, either financially or socially, with regards other people in their environment. This idea of poverty is closely linked to the notion of inequality. According to Hulme*et al.* (2001) relatively poor are those whose income/consumption level is below a particular fraction of the poverty line could be set at 50 percent national average. In some literatures Mowaf (2004) relative poverty is defined as is a concern how well off a person is with respect to others in the same society. Relative measures are usually preferred to absolute for it examines deprivation subject to a households' social and economic context. Similarly,a relative poverty line is usually set at an arbitrarily selection fraction of the average income or expenditure in a country. So, the relative poor are defined as those people whose mean expenditure per annum falls below the two-third of the national average expenditure per adult equvelent and varies with the level of averageincome in the country (MEDaC, 1999; FAO, 2001).

2.1.2.2 Subjective poverty line

The way of understanding poverty influences the subjective view that households have their financial situation as opposed to the objective focus that only uses observable and measurable variables.Closely related to relative poverty, as in Njeru (2005) subjective poverty has to do with whether or not individuals or groups actually feel poor. This is because those defined as poor by the standards of the day will probably have low self-esteem, and therefore see themselves as poor. Until recently, objective methods of poverty measurement have got more emphasis than subjective (Castilla, 2009). However, subjective measures; how individuals perceive their level of deprivation could be misleading. It can also be useful to compare

subjective and self-reported measures of well-being to objective measures based on observed income and consumption data.

2.1.3 Method of measuring poverty

Difficulty arises in determining which approach one should adopt and what indicators to use in measuring poverty (Meyer and Sullivan, 2007). Poverty is multidimensional and has to be looked at through a variety of indicators such as levels of income and consumption,when estimating poverty using monetary measures; one may have a choice between using income or consumption expenditure as the indicator of well-being. Information on consumption and income is obtained through sample surveys where households are to give feedback on their spending habits and sources of income, the nature of their basic needs and their perception of poverty. Income and non-income indicators like social indicators for education and health, access to services and infrastructure are used for data gathering and assessment of poverty situation (Asmamaw, 2004).

Quantifying the extent of rural poverty and its time trend are only the first step toward an analysis of its cause and policies for its reduction. No single poverty standard can be expected to meet the many demands placed upon it. Any meaningful intervention to combat poverty and food insecurity must start with a precise identificationthat the poor are, how many they are, and where they are located. The measurement of poverty is crucial for knowing what the situation is.Then we now briefly present some commonly used measures of poverty.

2.1.4 Monetary indicators of poverty

The monetary approaches to poverty impute a monetary value of poverty. It is most commonly used measurement of poverty. The monetary approach is mostly expressed with poverty lines and can be measured either on the basis of consumption or income. Consumptionis a better outcome indicator than income.Actual consumption is more closely related to a person's well-being. Most analysts argue that, provided the information on consumption obtained from a household survey is detailed enough. Slesnik (1993) found out that consumption based poverty indicators are significantly higher than those based on income and suggested the use of consumption- rather than income.

Consumption will be a better indicator of poverty measurement than income that is, of having enough to meet current basic needs. On the other hand, income is only one of the elements that will allow consumption of goods (Prennushi, 2003). This implies a potential difficulty for households in correctly recalling their income, in which case the information on income derived from the survey may be of low quality. In poor agrarian economies, incomes for rural households may fluctuate during the year of harvesting cycle.Consumption may be better reflect a household's actual standard of living and ability to meet basicneeds. The analyst may want to compute poverty measures with both indicators and compare the results.

Meyer and Sullivan (2007) provided evidence that commonly used household surveys have substantial under-reporting of key components of income arguing that consumption is better measured than income. According to the World Development Report (WDR),inmost developing countries, an income report of households is believed to be understated compared to consumption expenditure report. Income is so erratic and it may be very difficult for respondents to recall. However, for consumption to be an indicator of household's welfare it has to be deflated by an adult equivalent scale that depends on the nutritional requirement of each family member. The adult equivalent scale must be different age groups and the gender of adult members. Current consumption (including consumption from own production) reflects households' ability to buffer their standard of living through saving and borrowing, despite income fluctuations.

2.1.5Non-monetary indicators of poverty

Although poverty has been traditionally measured in monetary terms, it has many other dimensions. Poverty is associated not only with insufficient income or consumption but also with insufficient outcomes with respect to health, nutrition and literacy, and with deficient social relations, insecurity, and low self-esteem and powerlessness. In some cases it is feasible to apply the tools that have been developed for monetary poverty measurement to nonmonetary indicators of well-being. Applying the tools of poverty measurement to nonmonetary indicators requires the feasibility of comparing the value of the nonmonetary indicator for a given individual or household to a threshold, or "poverty line," under which it can be said that the individual or household is not able to meet basic needs. The influential

factors of poverty level are not only economical, but also social, political, cultural and geographical (Spaho, 2014).

2.1.5.1 Quantitative approaches of poverty measurement

Quantitative poverty analysis is a particular area of poverty research in which investigators with quantitative skills specialize. As is noted by White (2001), there is a perception by economists that quantitative techniques give more "rigidity" than qualitative. The first is inherently of quantitative issues, in the sense that they must be addressed using numerical information derived from sample surveys (Mwambu, 2005). Such data are analyzed using statistical techniques, with the interpretation of the results being guided by a discipline specific perspective,rather than by a broad social science model (Kanbur, 2004).

2.1.5.2 Qualitative approaches of poverty measurement

The approach of understanding of poverty requires a focus not just on overall numbers and trends, but also on the different individual experiences of the poor and the realities of poverty. In this aspect contrary to common belief that poverty could be quantified (UNICEF 2000), indicates that non-material assets of the poor could only be addressed in qualitative analysis. This has given rise to a new field of methodologies that has come to be known as the qualitative methods of poverty assessment. As indicated by Belayneh (2004) the qualitative techniques act as matching or even alternatives, to conventional quantitative approaches.The multidimensional views of poverty approachthe collection of objective and subjective.

2.1.5.3 Cost of basic needs approach measurement

Establish a minimum threshold of consumption necessary for achieving minimum standards of living (food, clothing, shelter) (often food needs are set at 2200 kilo calories per day per adult equivalent) the setting of the many combinations of food items to provide this caloric intake has got problem. However, this method is usually applied in determining the food poverty line based on the consumption data obtained from the household survey .Start by estimating cost of a 'basic' food bundle; this gives the food poverty line to estimate the quantities of various food items consumed by rural households, and this constitute the reference food basket.The potential difficulty for households in correctly recalling their

income, in which case the information on income derived from the survey may be of low quality. Despite its difficulties and shortcomings, in Ethiopia poverty line was defined based on the minimum subsistence requirement, 2200 KCal (Tassew and Wegayehu, 2004).

2.1.5.4 Estimating a poverty line

Once an aggregate income, consumption, or non-monetary measure is defined at the household or individual level, the next step is to define one or more of poverty lines. Poverty lines are cutoff points separating the poor from the non-poor. They can be monetary (for example, a certain level of consumption) or nonmonetary (for instance, a certain level of assets).The use of multiple lines can help in distinguishing among different levels of poverty. There are two main ways of setting objective poverty lines relative and absolute (Reardo, 2000).

Foster *et al.*, (1984) index was applied to identify the proportion of the poor to the non-poor, the gaps between them and the difference within the poor. These are poverty head count, poverty gap and Poverty severity indices. Therefore, many of the poverty measure use consumption instead of income. For the purpose of this study, among the available approaches discussed in the above section and measuring poverty, money-metric welfare indicator with consumption based measurement approach to poverty was employed as the welfare indicator of rural households,and then measured to include total consumption (food and non-food) expenditure of rural household.

2.1.6. Determinant of poverty in the rural area

Understanding the poverty central deficiencies in the resource base of the productive forces have become critical drawbacks in alleviating the poverty situation. Lack of equity in the access to productive resources and basic services and their consequential benefits as well as lack of access to opportunities to develop skills and human capabilities have impeded the socio-economic development of the poor. In addition, absence of the means by which the poor can address their problems and enhance their active participation in decision-making have hindered their attempts to move out of the state of deprivation (Asmamaw, 2004)

The2015/16 Household Income and Consumption Expenditures (HICE) survey was designed and conducted by CSA provides empirical evidence that enable shows that the poverty head count index, which measures the proportion of population below the poverty line in Ethiopia is estimated to be 23.5% with marked differences between urban (14.8%) and rural (25.6%) areas of the country and the food poverty line (average price) 2200 Kilocalorie per day per adult food poverty line 3772 birr and absolute poverty linewas 7184 birr in the country (MoFEC ,2015).Therefore, aims at updating the status and trends of national, ruraland urban regional poverty incidence, depth and severity as well as consumption inequality in Ethiopia. This result of updated poverty analysis study is considered to be useful for government and non-government organization, development partners for planning, policy analysis and monitoring and evaluation (Woldehanna, and Tafere, 2015)

2.2 Impact ofLivelihood diversification and Poverty situation

Ensuring sustainability and international development goals in regions of extreme poverty with a resource base prone to degradation is one of the most challenging policy issues today (Poole *et al.*2007). Integrated approaches to sustainable development that recognize the links between social and economic development, and environmental protection are given a high priority to reverse the challenge. But poor farmers continue to depend on natural resources for their livelihoods to meet short-term needs rather than long-term sustainability goals (Okello*et al.* 2009). There is a need to understand livelihood-poverty links that recognize heterogeneity at community and household level to achieve sustainability goals. There isues of poverty, livelihoods of poor people, and development policies are all linked to the concept of sustainability containing environmental, economical, and social aspects.

2.2.1 Determinant and driving forces for livelihood diversification

The agriculture spherethat might be moreeffective inassisting the households concerned. As (Toulmin*et al*. 2000) said in their report (*Diversification of Livelihoods: evidence from Mali and Ethiopia).*If equity and gender issues of particular importance, may diversification provide a more effective. The detailed look at diversification activities was an attempt to see how poor rural households worked and to counter the view that they were purely agriculture-based. As a result, it was hoped that policy makers could be encouraged to look, if necessary,

at policies outside pathway to improving livelihoods than reliance on raising crop yields alone? Indeed, they questioned whether a poor household would ever be able to generate enough assets and labour to run a farm and whether it would be better for them to focus their efforts on a specific niche activity such as trade, market gardening or firewood collection.

2.2.2Overview of Sustainable Livelihood Frame work(SLF)

SustainableLivelihood Framework(SLF)particularly focus on the component of vulnerability context, livelihood asset, polices and institutions, livelihood strategy, and outcomes.The livelihood diversification strategy and outcome the poor as an asset accumulation strategy for the better-off the contextual and conceptual relationships among both and the factors that are closely associated with them need to be critically looked upon. On the other hand so far as livelihood research is directed to the diagnosis of the status of poverty, the circumstances of poverty and to put decision way out of poverty should be identified.The framework shows how, in different contexts, sustainable livelihoods are achieved through access to a range of livelihood assets which are combined in the pursuit of different livelihood strategies to achieve livelihood outcomes such as increased income (Alinovi*et. al.*2010).AccordingtoVedeld*et al.*,(2012) various social relations, institutions, organizations, policies, as well as trends, shocks and seasonality modify access to and ability to convert livelihood assets into livelihood outcomes.

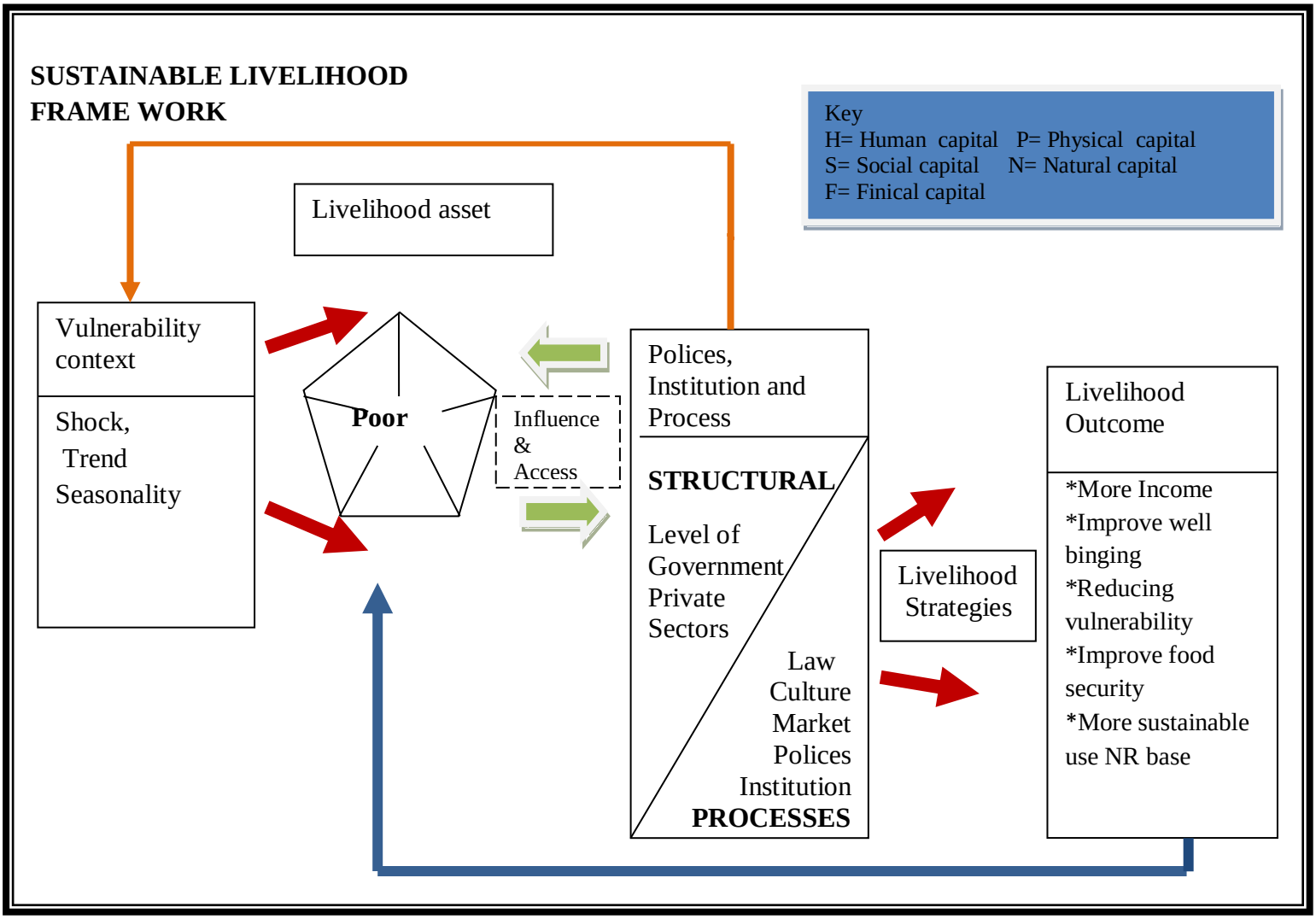

Figure 1.Sustainable livelihoodframe work***source****; DfID, guide line sheet (2000)***

The framework places people, particularly rural poor people at the center of a net of inter-related influences that affect how these people create a livelihood for themselves and their householdsnear to the people at the center of the framework are the resources and livelihood assets that they have access to and use.

Vulnerability context rural household

The rural people affected by natural resources, technologies,their skills, knowledge and capacity, their health, access to education, sources of credit or their networks of social support. The extent of their access to these assets is strongly influenced by their vulnerability

context, which takes account of trends economic, political and technological, shocks,epidemics, natural disasters, civil conflict and seasonality prices, production and employment opportunities. Access is also influenced by the prevailing social, institutional and political environment, which affects the ways in which people combine and use their assets to achieve their goals or livelihood strategies (DFID, 2000).Economic crisis and natural disaster are other causes of vulnerability that affect living standard and their ability to escape poverty.

As indicated that World Bank (2014) adverse shocks such as illness, injury and loss of livelihood have dreadful impacts, and are significant causes of destitution then this shocks play major role in pushing households below the poverty line and keeping them.Not all trends and seasonality must be considered as negative; they can move in favorable directions too. Trends in new technologies or seasonality of prices could be used as opportunities to secure livelihoods (Carney, 2002).In the researchers from social science field tend to view vulnerability as representing the set of socio-economic factors that determine people's ability to copewith stress or recover from the shocks and change (Allen, 2003).

Livelihood assets/capitals

Resources and livelihoods are inter-linked and this relationship determines who own what and what it is that they own. Murray (2001), indicates that assets should not be equated with capital which may distort the understanding of capital and the cause of poverty. The same author indicated that assets as material and social. Some of the key resources that therefore need to be looked into measuring poverty include natural capital, social capital, human capital, physical capital and financial capital. The multiple natures of the assets that people own and the diversity in life trajectories provide a holistic approach to poverty analysis.

Policies, institutions and processes (PIPs)

According to (DFID 2000) PIPs the levels of government institutions and public policies, as well as private sector practices and policy, and civic, cultural, economic and institutions that operate in society, which together help to determine and set parameters for the livelihood strategies which are open to poor people. The importance of PIPs for understanding livelihoods is that; in many ways it is the relationship between PIPs and vulnerability context that determines the choices that are open to people in pursuing their livelihood strategies. One

important way in which policies affect this is that by influencing the extent of households' access to or control over assets and affecting their activities. Institutions both formal and informal are also mediating factors in sustainable livelihood.

Livelihood strategies

Livelihood strategies are the combination of activities that people choose to undertake in order to achieve their livelihood goals, such as productive activities, investment strategies and reproductive choices (Alinovi*et al*., 2010). Rural livelihoods system comprises complex and diverse economic, social and physical strategies: where these strategies are realized through the activities, assets and entitlements by which individuals make a living and livelihood strategies are the planned activities that people undertake to build their livelihoods. They usually include a range of activities designed to build asset bases and access to goods and services for consumption. These strategies are determined by the assets and opportunities available to the people's different activities pursuit agricultures, non-agricultures or the combination of the two which are in turn affected by PIPs and changes in the vulnerability context as well as by the choice and preference vulnerable person livelihood approach.

Livelihood outcomes

According to the Sustainable Livelihood Framework (SLF), studying poverty must take into account people's views with regard to how they perceive their situation, including what they see as the factors that render them poor. Livelihood outcomes are the results of people's livelihood strategies and feed back into the vulnerability context and asset bases, with successful strategies allowing them to build asset bases as a buffer against shocks and stresses, as opposed to poor livelihood outcomes which deplete asset bases, thereby increasingvulnerability.Livelihood outcomes may therefore lead into either honest or violent cycles. In most cases, livelihood outcomes can be thought of as the inverse of poverty (DFID, 2000).

2.2.3. The effect of nonfarm income on household poverty

Diversification of income activities has become an important aspect of rural livelihoods due to continued low agricultural income and output. Non-farm income activities have the potential to reduce rising rural unemployment, providing more income opportunities for young people,

women and other vulnerable groups. Furthermore, off farm activity is positively correlated with income and wealth and way out of poverty (Barrett *et al*, 2001).Even though agriculture is the main stay of developing economics it is unable to provide a sufficient means of survival in rural areas due to high population growth, vulnerability to drought and decline in the ratio of agricultural land to population. To alleviate this insufficiency of agriculture, rural households in developing countries use off /nonfarm diversification as a survival strategy. Thus, to provide empirical evidence on the links between livelihood strategies and poverty using a combination of typologies identified from a range of income sources assets, strategies from rural household livelihood diversification context.

2.2.4 Linkage of farm and nonfarm activities on household poverty

Non-farm activities have the potential to play a crucial role in reducing vulnerability to poverty by providing households with a form of insurance against the risks of farming and reducing reliance on natural resources (Martin & Lorenzen,2016; Simtowe*et al*, 2016).state four roles of non-farm sector as: "First, the non-farm sector produces lower quality goods and services which are often used by the poor; good performance of this sector indirectly contributes to lowering prices to the poor households. Second, it is a major source of employment to the poor who, due to ownership of small land or high cost of land, cannot depend on farming alone. Third, through expansion into non-farm activities, it also provides a way of spreading income throughout the seasons, for households with limited access to micro-finance sources. Fourth, good performance of this sector can sustain agricultural labour market, increase local wages, thereby reducing rural poverty". Non-farm income is often a source of expansion and investment in agriculture and other households" capital investment.

2.2.5 Relations between assets, livelihoods, poverty, and resource management

The diversifying livelihood activities tend to have positive outcomes in terms of household income. Diversification of portfolio of livelihood activities has been pointed out as a more realistic approach for poverty reduction (Liping *et al*. 2008). According to World Bank (2008) recommendation, households that pursue diverse income portfolios including off-farm income are likely to take up new farming technologies and engage in resource conservation practices. Household who were in less diversified engaged in less casual off- farm activities as a means

of survival to meet their food demands and household income. This is because the poor are deprived of major capital assets the family labour that may limit resource use and management. Such differenceof asset endowments in rural heterogeneous households has been widely demonstrated by other researchers in developing countries (Okello *et al*. 2009).

2.3. Empirical Review of the Study

Rural households in Africa are increasingly depending on combinations of activities there have been numerous empirical studies on the link between economic growth and poverty. The start of the Millennium Development Goals (MDGs) and Poverty Reduction Strategy Papers (PRSPs) have underlined the need to establish the relationship between growth and poverty. In rural as, it is evident that the most effective means to increase income and reduce poverty is to increase the productivity of local activities which households depend on for their livelihoods. In Ethiopia promoting rural enterprises is vital for economic growth and poverty reduction (MoFED 2006). There are many empirical studies in Ethiopia which investigated determinant factors of livelihood diversification.

2.3.1Empirical evidence on determinants of livelihood diversification rural households

Simtowe *et al* (2017) using binary logistic regression model and thematic analysis determinants of non-farm livelihood diversification: evidence from rain fed-dependent smallholder farmers in north central Ethiopia.Access to adequate capital, poor infrastructure and lack of training are the major constraints which hindered farmers from undertaking non-farm.The result revealed that several factors determine the propensity of smallholder farmer's participation to non-farm activities. Better-off households led by literate and younger heads, having access to microfinance, having extension services, and having social responsibilities create engagement in non-farm economic activities. Empirical findings evidenced that, those engaged in non-farm livelihood activities are more likely to meet the basic need of their family, are more capable of withstanding shocks and having a more stable livelihood than those that have to farm as a single source of their income.

Eshetu and Mekonnen,(2016)using both binary logit and multinomial logit model to analyze factors affecting off farm income diversification and its effects on rural household poverty

inGamoGofa Zone, Southern Ethiopia. The regression result revealed that age, education, access to infrastructure, livestock ownerships, credits uses, and farm income are the main determinants of households' participation in off farm activities. In addition, off farm participation rate was 76% while off farm income accounts for 51% of the total household income in the study areas. The estimation results of the logit model also showed that off farm participation significantly reduces the probability of being poor of rural farm households. The study also determined the poverty line and about 29.8% of the population were found below poverty line.

Yiznegaw *et al* (2014) using both descriptive statistic and multinomial logit model applied determinants of livelihood diversification strategies: The case of smallholder rural farm households in Debre Elias Woreda, East Gojjam Zone, Ethiopiato investigate the determinant factors influencing the households' choice of livelihood strategies.The descriptive statistics were used to identify the livelihood strategies and the livelihood assets. The finding of the survey result indicates that much of the rural households (61%) in the study area practice diversified livelihood strategies that combined on-farm activities with non/off-farm activities In this regard, the econometric analysis demonstrated including land size, livestock holding size, sex of household head, mass media, market distance, total annual household income, and urban linkage are found to be the significant determinants.

The study Gecho (2017) using both descriptive statics and binary logit model was appliedrural farm households' income diversification in the case of Wolaita Zone Southern Ethiopia. The main aim of this study was to identify the determinants of farmers' participation in income diversification in the study area. The findings of the study indicates that rural households in the study area practice diversified income sources, in that about 57.7% of the households combine agriculture with other activities (non/off-farm).Some farmers were pursuing non-farm and off-farm activities as the primary income sources rather than agriculture. Considering the wealth status, the poor households derive almost half 50% of their income from nonagricultural activities whereas the latter accounts for only 6.4% of the income of the better-off households The results confirm that factors such as sex, farm size, livestock ownership, oxen ownership, education, leadership, annual cash income and market distance were key determinants of farmers participation in income diversification.

The other study conducted Manlosa *et.al.* (2019) using generalized linear model analyze that livelihood households combine capital assets in a process involving human agency and resourcefulness to construct livelihood strategies and generate well-being outcomes. The characterized types of livelihood strategies determined how different capital assets are associated with different livelihood strategies; and determined how livelihood strategies differed in food security outcomes. The study conducted on Southwestern Ethiopia used principal component and cluster analyses. Five types of livelihood strategies, which differed mainly in food and cash crops comprising the strategy. These were, in order of decreasing food security: 'three food crops, coffee and khat' five types of livelihood strategies, which differed mainly in food and cash crops comprising the strategy, were identified. The livelihood strategy 'three food crops, coffee and khat' was associated with a wide range of capital assets, particularly having larger aggregate farm field size and learning from other farmers.

Gebru *et al.* (2018) using multinomial logistic regression model to analyze the determinants of livelihood diversification strategies in Eastern Tigray Region of Ethiopia. The result indicated majority 83.1% of the farmers were able to diversify their livelihoods into either off-farm or non-farm or combined income activities, whereas the remaining 16.91% of the households were unable to diversify; often lacking the means to engage in any form of income-generating activity apart from agricultural activities.The results revealed that households choice and adoption of livelihood diversification strategies were positively affected by households level of education, access to credit, income, membership to cooperatives, land size, and farm input use, whereas age, dependency ratio, family size, access to extension services, distance to market, livestock ownership and agro-ecology negatively affected livelihood diversification.

2.3.2 Empirical finding of impact assessment livelihood diversification rural household

Yousuf and Zeleke,(2013) using logit model and PSM to assess the impact of livelihood diversificationon rural household food security in FedisWoreda of Eastern Hararge Zone Oromiya Region, Ethiopia. Moreover, the study identified livelihood activities employed by households, determine food security status of households. Income share method was used to

identify diversified and non diversified households. The descriptive statistics for diversified and non diversified households shows that the two groups had a significant mean difference with respect to education year of the household head, number of times the household received extension service in a year, participation in productive safety net program and calorie intake by the household members in adult equivalent. The result shows that education year of the household head, membership to cooperatives, number of times the household received extension service in a year and participation in productive safety net program significantly affect diversification. Results from propensity score matching shows that livelihood diversification brought a positive impact on households' food security by showing that the mean difference in calorie intake is significant at less than 1% probability level. The study concluded that livelihood diversification can have a positive impact on rural households' food security.

Baharu Gebreyesus,(2016) using Composite Entropy Index (CEI) and for measuring livelihood diversification and 2SLS model was employed The effect of livelihood diversification on household incomeevidence from rural Ethiopia. Then 2SLS model was employed to detect the effects of CEI on household income the results indicate that livelihood diversification has a positive and significant effect on household income the result implies owning higher number of livestock and larger size of farm land with better access to improved seed and family labor use helps rural households significantly improve their farm income in particular and household total income in general.

Additionally, Dzanku (2015) finds that the welfare impact of off-farm diversification is low in Ghana because off-farm diversification in rural areas is transitory because there is a wide variation between livelihood activities and professional vocation development. Some studies also high light the importance of social capital as instrumental for accessing and securing non-farm activities, implying that poorer households lacking networks and other forms of social capital are least able to diversify into non-farm sectors that could otherwise aid their income and well-being .These indicate the off-farm sectors have not only fostered hope but also create inherent challenges in terms of their potential for poverty reduction.

Oyakhilomen,(2016) using simple descriptive statistics,FGT poverty and Tobit regression model were analyze to determine the effect of livelihood diversification on poverty alleviation

in Giwa Local Government Area of Kaduna state, Nigeria. The result of the FGT poverty model revealed that the incidence of poverty among the farming households was 30%, implying that 70% of the farm households were not poor. The result showed that livelihood diversification was significant and was negatively related to the poverty level of the farmers. This implies that a farming household head who engages in a number of livelihood activities has a lower likelihood of being poor. The increase in the number of livelihood activities increases the income of the farmers and in variably their purchasing power and welfare.

2.3.3 Empirical evidence of household poverty status in rural areas

Tsegaye *et al.* (2014) using binary logit regression model to analysis of rural poverty and exit time: The case of Gozamn District of East Gojjam Zone, Ethiopia.The CBN approach of setting absolute poverty line was used and the estimated poverty line was found to be ETB 3650.75 per adult equivalent per year. Results of the FGT poverty index revealed that about 49 % of the sample rural households live below poverty line with 9.5% and 3.1% poverty gap and poverty severity, respectively. The average time that the poor rural household might need to exit poverty was estimated to be 4.4 years provided that the 6.4% GDP per capita growth rate per year continues. The results revealed that education, livestock ownership, cultivated land holding, oxen holding, off-farm/non-farm income, credit utilization and frequency of extension contact were found to be as theoretically expected, statistically significant and have a strong negative association with the poverty status of rural households whereas family size alone was found to have a positive association with poverty status of rural households. Hence, promoting equitable economic growth, adult education, family planning, expanded diversification, fostering rural-urban linkages, increasing land productivity, irrigation technologies and promoting research-extension-farmer linkage are indispensible policy interventions to better target rural poverty.

Feleke *et al.*(2018) using bivariate analysis of rural Uni-dimensional and Multi-dimensional poverty profile by FGT indices profile of rural uni-dimensional and multi-dimensional poverty by household characteristics: the case from kuyu district, central Ethiopia The major objective of this study was to look into profile of rural poverty by household characteristics in terms of the socio-economic and demographic characteristic of the household dimensional poverty also shows that poverty is more severe among age sub-group of 20 to 29 years, non

formally educated household heads, households without vocational training, households not access to health service, households who take their sick household members to traditional healer, households who do not use fertilizer, and households who do not using improved seed for their farm. The final conclusion is that effort should be made to improve these socio-economic and demographic factors to alleviate rural poverty.

According to study in Tanzania, also poverty was strongly associated with lack of land and livestock as well as inability to diversify to non-farm alternatives when farm opportunities are diminishing (Ellis and Mdoe 2003). The role of leadership and elites (access to social capital) in controlling livelihoods and environmental benefits has been observed where there are more lucrative enterprises in Kenya (Okello *et al*. 2009). The optimal combination of investments in five forms of assets (human ,natural, physical, financial, and social) is a necessary condition for sustainable rural development that thrives to achieve positive livelihood outcomes.

2.4.Analytical frame work of the study

The analytical frame work for this study is drawn from the Sustainable livelihoods framework (SLF).The study were use with a particular focus on the all component of sustainable livelihoods frame work such as, vulnerability context, livelihood asset, polices and institutions, livelihood strategy and livelihood outcome poverty reduction. The livelihood diversification strategy and outcome of poor as an asset accumulation strategy for the better-off the contextual and conceptual relationships and the factors that are closely associated with them need to be critically looked upon. On the other hand so far as livelihood research is directed to the diagnosis of the status of poverty, the circumstances of poverty and to put decision way out of poverty should be identified. The framework shows how, in different contexts, sustainable livelihoods are achieved through access to a range of livelihood assets which are combined in the pursuit of different livelihood strategies to achieve certain livelihood outcomes such as increased incomes (Alinovi *et al.*, 2010). Vedeld *et al.,* (2012) point out various social relations, institutions, organizations, policies, as well as trends, shocks and seasonality modify access to and ability to convert livelihood assets into livelihood outcomes. The inter linkage between assetsVulnerability context,Policy and

institutionalcontextwith the dependantvariable livelihood diversicatoin and outcome variable household poverty illustrate in (Figure 2).

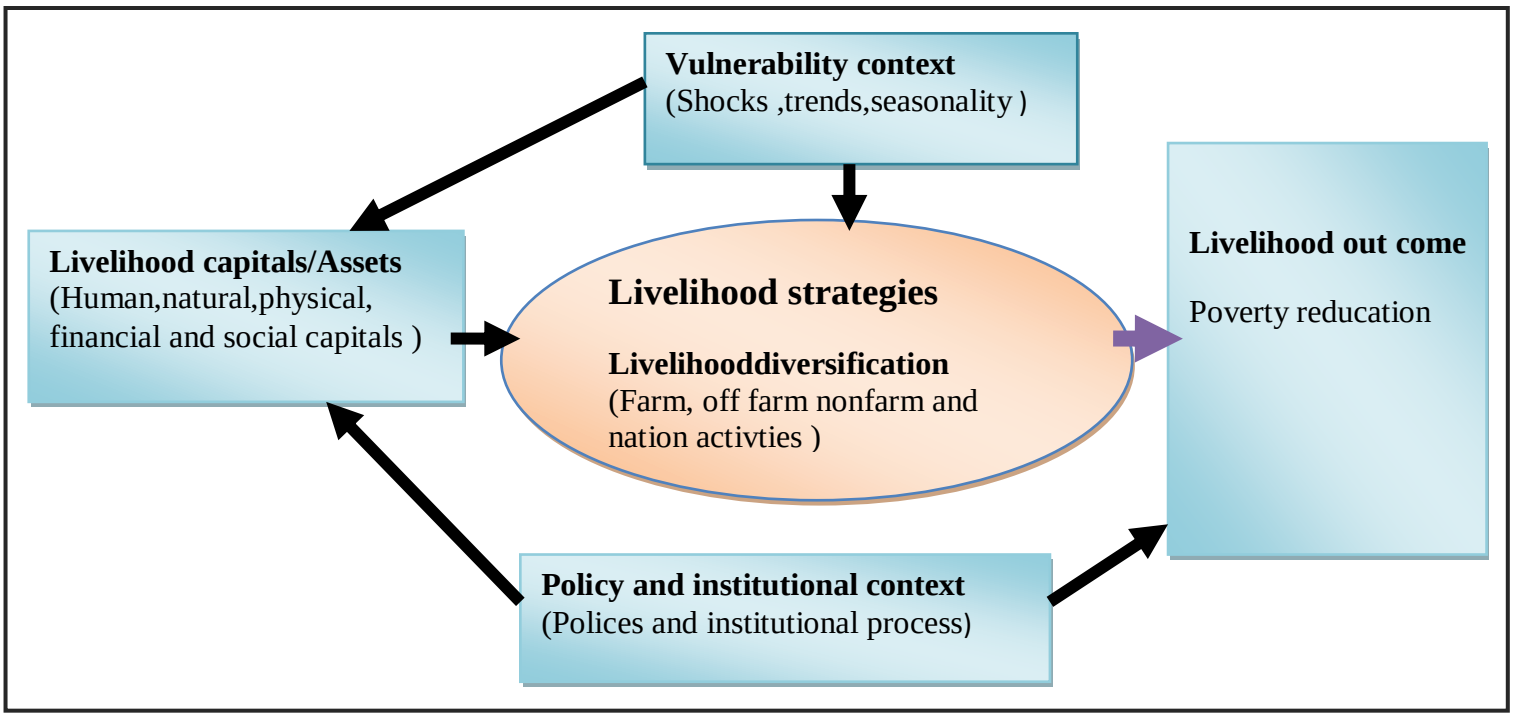

Figure 2: Analytical frame work of the study ***sources*** **:** adopted from DfID (2000)

3. RESEARCH METHODOLOGY

This chapter describes the study location, the methodsto collect and analyze data, and the study variables with working hypothesis. It begins with describing the geographical location,agro-ecological and demographical characteristics of the study area. This is then followed by a description of survey design and sampling size and procedure including sources, methods and types of data collected for empirical analysis. The section also provides the methods adopted for data analysis, with specifications of formulae (models). It finally ends by defining the study variables and describing the working hypothesis.

3.1 Description of the Study Area

Thestudy was conducted in a two purposively selected rural administrative woredas namely (Gera and Mana) of Jimma zone. Jimma zone is one of the 18 zones of Oromia Regional State located to the Southwest of Ethiopia, at a distance of 352km from the capital city of the country; Addis Ababa. The zone have 21 woredas and one city town with a total population of 2,780,549 living in 543 kebeles(CSA, 2015). The area receives annual rainfall on the range of 1200-2800 mm and temperature16-20^{0}C in normal years the rainy season extends from February to November is suitable for growing coffee, cereals, and pulses, root and fruit crops. The highlands and the swampy areas grow maize and barley as a belg season crops using residual moisture in the depressions. Only 25% of farmers in the area possess one or more oxen. Despite considerable deforestation in recent years, 27% of the total area of Jimma Zone remains forested (natural, artificial, shrubs and bushes) (Kruk*et al*, 2010).

3.1.1 Location and topography of study area

Gera woreda:is one of the 21 Woredas in Jimma Zone.Itfound between 35.9ºto 36.4^O N longitude and 7.5^{O}E to 7.9ºE latitude. The woredais bordered on the south by the Gojeb River which separates it from the Southern Nations, Nationalities and Peoples Region, on the Northwest by Sigmo, on the North by Setema, on the Northeast by Gomma, and on the east by SekaChekorsa.; The altitude of this woreda ranges from 1390 to 2980 m. a. s.l land in this woreda shows that 26.5% is arable or cultivable (23.4% was under annual crops), 7.0% pasture, 56.6% forest, and the remaining 9.9% is considered degraded, built-up or otherwise unusable. In the area spices, maize and teff growing, predominantly coffee and honey are

important cash crops. Over 50 square kilometers are planted with coffee(CSA, 2015) reported a total population 135,426 of whom (67,035 were men and 68,391 were women), 4,746 or 4.22% of its population were urban dwellers.

Mana woreda:is one of the 21 Woredas in Jimma Zone. It found between 36.6^{o} to 36.8^{o}N Longitude and 7.6^{o} to7.9^{o}E Latitude and it bordered on the south by SekaChekorsa, on the west by Gomma, on the north by LimmuKosa, and on the east by Kerssa. The administrative center of this woreda is Yebu. The landscape of Manna includes mountains, high forests and plain divided by valleys the land in this woreda shows that 89.1% is arable or cultivable (86.1% was under annual crops), 2.7% pasture, 2.8% forest, and the remaining 5.4% is considered swampy, degraded or otherwise unusable. Chat and coffee is the major cash crop over 5,000 hectares are planted with this crop. Total population 196,503 was about (100,065 male and 96,438 female) or 3% of its population were urban dwellers. (CSA, 2015).

3.1.2 Farming system of the study area

Agriculture is the main economic activity tosupport the community and most households use extensive farming techniques. The farming system of the woreda is mixed, where crop and livestock sub-systems are interdependent.The system largely depends on rain fed subsistence agriculture, mainly on cultivation of field crops, of which cereals (maize, sorghum, teff and finger millet)from perennials fruit mainly avocado and banana take the dominant ratio. Vegetables crops such as onion, tomato,potato, cabbage, sweet potato farmers they have land produced on the home garden meant for home consumption. Enset (kocho) the strategic plant consuming during the off season in the area, while coffee, chat and honey the main income generating to the livelihood of household in the study area. According to Walta Information Center reported that farmers of manna woreda on 28/ September, 2006 sold 99,850 quintals of washed and unwashed coffee bean, estirnted 27.3 million Birr (WIC,2006).Livestock is providing significant role for the livelihood of the study area;food, plough ,draught transportationand economic value,small ruminant (sheep and goats) production and bee-keeping are wide spread, while cattle production is less important due to lack of grazing land.

3.1.3 Natural resource of the study area

The study area is known for having highly dense forestand ever green. The soils typeis largely volcanic in origin and relatively fertile. The moist forests are the main natural production assets of the afromontane moist forests in Ethiopia Belete forestis found in theGera woreda.According to Stellmacher (2012), the presence of relatively higher percentage of lower diameter sizes in the forest indicated that the forest was at stage of secondary regeneration.The population structure of species such as(*Punusafricana)*showed reproduction and the forest holds genetic components and populations of wild Coffee (*Coffee arabica*) and several associated economic plant species and wild mammals and different spices of biodiversity is living. Since a great proportion of the population living close to forest patches depends on forest products particularly, non-timber forest products such as honey, 'wild' coffee, spices, fruits, and medicinal plants, are high importance, for both home consumption and as cash crop.

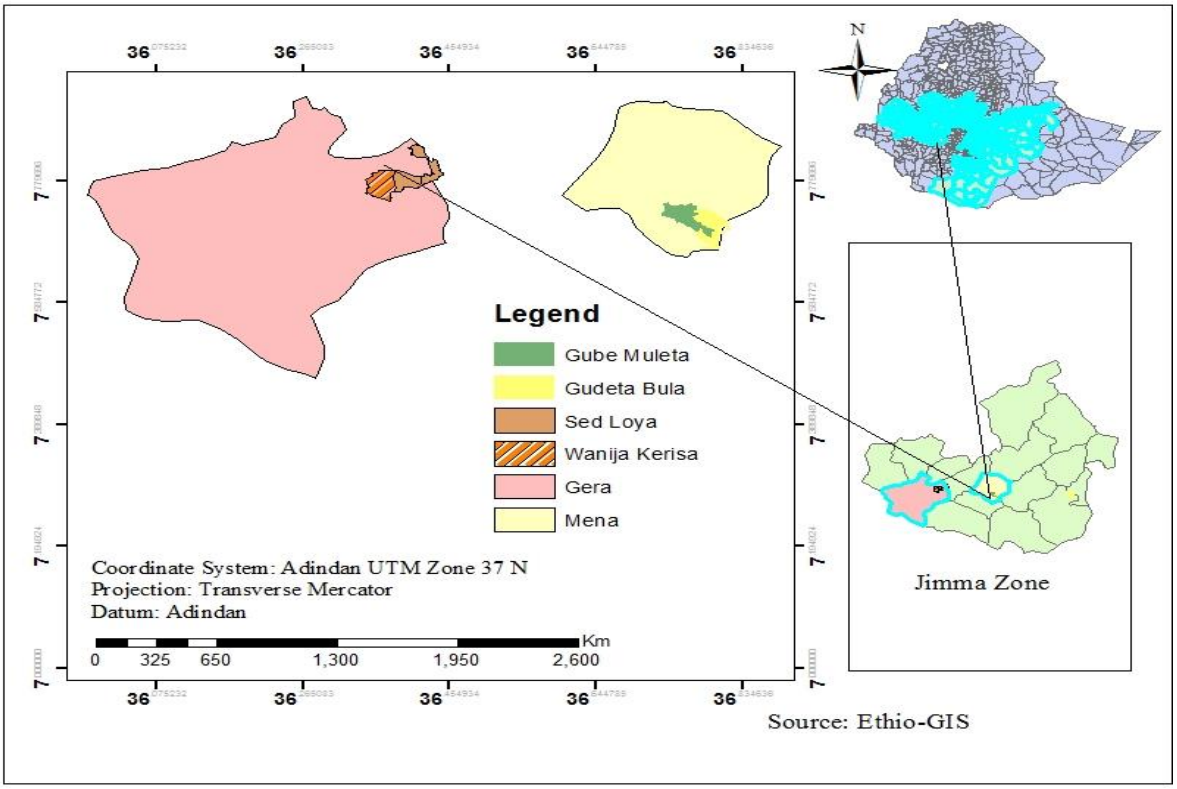

Figure 3: Map of the study area ***Sources:***FromEthiopia.GIS(2019)

3.2. Research Design of the Study

Cross sectional research design were used for this research. The research focus of the study were described of information related to rural livelihood diversification by collecting cross sectional data from two woredasof study area.

3.3 Sampling Procedures and Methods

In order to conduct the study in a representative way and to increase its reliability and validity a both purposive and simple random sampling procedure were employed. Accordingly, multi-stages random sampling procedure was employed. In the first stage two woredasnamely; Gera and Mana werepurposively selected based onthe high rate of local people's participation in diverse livelihood activities. In the second stages four representative samples kebeleswere selected randomly from total kebeles found in both woredas(two Kebeles from each woreda).Finally, a totalof 385 sample household were selected using simple random sampling

techniques.Propration population sample size were usedto redistribute sample household across kebeles.

3.3.1 The total population of the study woredas

Gera woreda have 29 kebeles and number of total population was about **135,426 (**male 67,035 and female 68,391). The total household head was about **19,213** (male 18,328 and 885 female) respectively. Similarly Manaworeda have 24 rural and two towns thetotalkebeles26 and total population 196,503 was about (100,065male and96,438 female) and **22,501** total household (male 21,341 and female 1,160).The overall total population and household of two woredas**331,929**and **41,714** respectivly (Table,1).

Table 1.The total population of study woredas

Woredas	Number kebeles	Total population			Total HHD		
		Male	Female	Total	MHH	FHH	Total
Gera	29	67,035	68,391	135,426	18,328	885	19,213
Manna	26	100,065	96,438	196,503	21,341	1,160	22,501
Total	**55**	**167,100**	**164,829**	**331,929**	**39,669**	**2,045**	**41,714**

Source: *From secondary data of woredaagricultural office (2019)*

3.3.2 Sample size determination

The sample size of this study was determined by using the maximum sample size formula ofFowler(2001) and then adjusted for the total population of the study area by Cochran's sample size formula employing (Cochran, 2004) as shown below.The researcher decided to error may exceed the acceptable margin of 5% with confidence level 95% and estimated proportion of an attribute that was present in the population p=0.5.In order to calculate the final sample size, we have considered the total population of the study area. Therefore, Cochran's (2004) correct formula was used to calculate the final sample size in the study area.

$$n_o = \frac{Z^2 * pq}{d^2} \quad n_1 = \frac{n_0}{1 + \frac{n0}{N}} \longrightarrow$$

$$n_o = \frac{1.96^2 * (0.5) * (0.5)}{(0.05)^2}$$

Where

n_o = Desired sample size Cochrans (2004) when population is less than 10,000

n_1 = Finite population correction factors Cochrans (2004) when population is greater than 10,000

Z = Standard normal deviation (1.96 for 95% confidence level)

P= population proportion to be included in sample

q = 1-p i.e 0.5

N = Total number of populations which is greater than 10,000

d=degree of accuracy desired (0.05)

Total simple size = 385 households

3.3.3 Sample size distribution and sampling technique

The(Table, 2) indicate that thesum of the total population, total households and sample size of four kebeles 15,753, 2,727 and 385,respectively.The sample frame work from 2,727 total household of four kebeles because of target population of the study is household level then by using simplerandom sampling techniques proportion ofpopulation sample size (PPS) were used for the distribution of sample acrossfourkebeles 63,118,70 and 134 respectively.

Table 2.Population household and samp kebeles of the study area

	Woredas	Name of kebeles	Total population	Total household	Sample households		
					M	F	Total
1	**Gera**	Sadi Loya	2445	445	49	14	63
		WanijaQarsa	3982	838	95	23	118
2	**Manna**	Gudata Bulla	3362	495	50	20	70
		Gube Mullata	5964	949	105	29	134
	Total		**15,753**	**2,727**	**299**	**86**	**385**

Source: *computed own data obtained from Woreda Agricultural Office (2019)*

3.4 Types and Sources of Data

To achieve the objectives of the study,data were collected from both primary and secondary sources. Data from primary source mostly focused on demographic and socio economic characteristics,livelihood strategies pursuit by sample households and the consumption of food item and non-food expenditures of household use.These primary data were collected from sample households, Development Agents, Woreda agricultural extension workers and well experienced farmers in each kebeles. Secondary data were collected from publishedand related literatures were reviewed materials obtained and utilized from various sources andunpublished sources such as reports of zone and woredaagricultural office and on issues associated with rural households participating livelihood diversification. Moreover, both qualitative and quantitative data were collected from these primary and secondary data sources. Finally, primary data were supplemented with secondary data in order to bridge information gap from primary sources.

3.5. Methods of Data Collection

To achieve objectives of the study the following methods of data collection were employed.

Interview schedule/household survey: The questionnaire were design to collect both qualitative and quantitative data by enumerators asking howchanging their livelihood circumstances (such as employed, assets, business activities incomes, savings investments the vulnerability context of sample household and livelihood strategies factors at household level).(See the survey schedule inappendix part).Field trips were made before the start of the actual survey to pre-test the questionnaire on selected rural kebeles. For pre-testing purpose, some household heads out of the sample households were interview. After incorporation of modifications, the final version of the questionnaire was used to gather the data from rural households relevant for the study was prepared. Piloting was carried out for 38 households which make 10 percent of the total number of the 385 households involved in the study. According to Kothari (2008) information obtained by means of questionnaires is free from bias as the person conducting the research cannot influence the respondents hence accurate and valid data can be obtained.

Key informant interview: In-depth interview were made with group of experts who are most knowledgeable about their community (elders, women's and leaders) those residents were considered.Those farmers and experts living around there for long period of time were interviewed. Accordingly, based on distributions of sample size from each kebeles the number of key informant were 7,6,4and3 from GubeMullata, WanijaQarsa, GudataBulla and Sadi Loya, respectivelytotallyabout 20 key informants were interviewed.They often are used as part of study evaluations and needs assessments, though they can also be used to supplement survey findings, particularly for the interpretation of survey results they in any way representative of the general population that may be affected by whatever issue is being studied.

Focus group discussion (FGD): Discussion was used as methods of collecting qualitative data and used as mapping out systems. It answers questions of why and how, especially concerning the data collected in the interview schedule. This assessment was conducted in the second stage after finishing the household survey in sample kebeles using a check-list questionnaire. The reason for this is the (FGD) were expected to classify sample households livelihood diversification. Qualitative data inorder to capture the vulnerability context, livelihood asset,institution livelihood strategies and household's resources endowment. For this purpose preference ranking/scoring, wealth/wellbeing ranking, trend during analysis, charts and short feature stories were employed to open discussion.FGD (Head of the study woreda of agricultural office, extension experts, two elders, two women's, two model farmers kebele administration chairman and representatives from NGOs working in the woreda)were part of the focus group discussion and conducted one groups from each kebeles,totally four group wereorganize formanageable totaly ten participant in each group small number to used save time and easily communicated each other andthe discussion were held for one and half anhourin Afaan Oromo and transcribed in English.

Personal observation;personal observation were used mainly to triangulate the data collected through interview schedule, focus group discussions and key informant interview. Information's like livelihood asset bases, major vulnerability contexts, policy and institutional frameworks, livelihood strategies and livelihood out comes. Check lists are used to guide what to observe.

Table 3.Methods and types of data collection

S/N	Data type	Methods of data collection	Objectives to be achieved
1	Primary data	Interview schedule (Qualitative and Quantitative data)	Objectives (first, second and third)
2	Primary data	Key informant interview (Qualitative data)	Objectives (first, second and third)
3	Primary data	Focus group discussion (FGD) (Qualitative data)	Objectives (first, second and third)
4	Primary data	Personal observation (triangulated)	Objectives (first, second and third)
5	Secondary data	Referring Articles, reports of zonal and woreda repots and published materials, zonal and woreda repots	Objectives (first, second and third)

Source: *Authorcomputation (2019)*

3.5 Method of Data Analysis

After the data collection and recovery, editing, coding and data entry into the computer followed. The data were processed and analyzed descriptive statistics, econometric model andpropensityscor matching(PSM) applied. Evidence was produced in different ways and then the interrelationships between different components of rural household livelihood diversification on household poverty were analyzed using the methods presented and discussed in this section.

3.5.1Descriptive statistics

Descriptive statistics such as mean, percentage, standard deviations and frequency.Besides-testwas used for continuous explanatoryvariables and a chi-square test for discrete (dummy) variableswererevealed compare and contrast the mean difference ofhouseholds in poverty status (poor households vis-a-vis non-poor) and livelihood diversification(diversified vis-à-vis nondiversified)with respect to the desired to draw some conclusion in the study.Econometric model such as binary logistic regression and propensityscore matching were used. Binary logistic regression model was used to analysis the major determinants of livelihood diversification.Propensity score matching was applied to identify thesignificant impacts of livelihood diversification on household poverty.

3.5.2 Methodand measurements of poverty

To measure a household poverty status of this study adopted Cost of Basic Needs(CBN) approachwas employed in estimating the poverty line, because of the advantages Poverty lines are cut-off points separating the poor from the non poor household by obtaining the predetermined minimum amount of 2200 Kcal which is per adult equivalent.Poverty identifying variousmethods of quantifying. First, one has to choose the relevant dimension and indicator of well-being. Second, one has to set a poverty line, that is, a threshold below which a given household or individual will be classified as poor. Finally one has to select a poverty measure to be used for reporting for the population as a whole or for a population sub-group only (World Bank, 2003).

3.5.2.1Poverty measures and procedures of cost basic need approach

To obtain the kilocalorie the data gathered from household consumption survey were recoded into a computer excel-sheet. Each individual's household seven days data food items was converted into month and then into year bases. After calculating the volume of food items in kilogram then uses the mean conversion value of kcal per kg/lt.This average basket using standards (2200 kilocalorie conversion factor) adopted from Ethiopian Health and Nutrition Research Institute were measured (EHNRI, 2008) for each food items we obtained the amount of calorie each family basket food items that are consumed per day. By using the conversion factors the family size was converted into adult equivalent (AE).The total kilocalorie obtained from basket food items of the family was divided by the adult equivalent to get the amount of average kilocalorie a particular household obtained per AE/day.

The same way, by taking the sum of average value local market prices of each food items and the average local prices for own produces and multiplying by the value of kcal/AE/day we obtained the amount of money need to get the basket food items for individual per day.Once the foodcomponent of the poverty line is selected. To account an allowance is given to the non-food components, suggesting that the percentage of the food poverty line devoted to non-food consumption by household with total consumption to this poverty line is considered essential non-food consumption using a simple linear regression of the share of food

expenditure to total expenditure(S) to compute total poverty line following the approach of (Ravallion and Bidani 2008).

$$S_i = \alpha + \beta log \frac{(TE)}{(FPL)i} + \epsilon i \quad \textbf{(1)}$$

Where: *i* runs through the sample households 1 to n after constructing poverty line using expenses of food and non-food basic needs.

Foster-Greer-Thorbecke (FGT) index

The Foster, Greer and Thorbecke (FGT) formula (Foster *et al*, 1984) is the most widely used. The values for the poverty measures ,headcount index (H), poverty gap index (PG) and Foster-Greer-Thorbecke present .The headcount index (incidence of poverty) computed for the study area were implying that the proportion of the households whose per capita expenditures fell below the poverty line. The FGT class of poverty measures some desirable properties they include some widely used poverty measures (such as the head-count and the poverty gap measures).

Poverty Ratio or Head Count Ratio

This measure estimates the percentage of population below a specified poverty line. To compute this measure, it is necessary to define and determine a poverty line. The most common and simplest measure of poverty, known as the **Head Count Ratio,** simply counts the number below the poverty line. Once the poverty line has been decided, the simplest way to measure the amount of poverty is Head Count Ratio which simply adds up the number of people who fall below the poverty line. However, the Head Count Ratio merely demarcates the poor from the non-poor but does not indicate the various levels of poverty within the groups of poor; i.e. .it is insensitive to income/expenditure distribution within the groups of poor or, in other words, the depth of poverty.

This is the share of the population that is poor, that is, the proportion of the population for which consumption, *Y* is less than the poverty line Z. Assuming we have a population of size N in which q people are poor, then the head count index is defined as:

Three conditions about poverty depending upon the weight attached to α:

1. Assuming that α=0, no weight is given to the severity of poverty. In this case the formula will be reduced to P (0) = $\frac{q}{n}$, **percentage of poor households** (head count ratio),

The index is specified as follows

P (0) = $\left(\frac{1}{n}\right)\sum_{i=1}^{q}\left[\frac{Z-y_i}{Z}\right]^{\alpha} = \frac{q}{n}$, α= 0 is greater than or equal to zero…….(2)

Where

q = people who are identified poor

N = Total population analyzed(number of poor households

Z= is the cut of point between poor and non-poor

Yi= Income of the i^{th}household(measure of average per capita food calorie intake/US$1)

a= is the weight attached to the severity of poverty

2. Assuming α = 1, which means that equal weight is given to the severity of poverty among all poor households. Summing the numerator gives the **poverty gap** and dividing this by Z expresses the figure as a ratio/index and results in the following expression for poverty gap.

P (1) = $\left(\frac{1}{n}\right)\sum_{i=1}^{q}\left[\frac{Z-y_i}{Z}\right]$……(3)

3. Giving more weight to the **severity of poverty** among the poorest households is equivalent to assuming α > 1. A common in the poverty index is to set α = 2, yielding the severely poor groups among the poor groups.

P (2) = $\left(\frac{1}{n}\right)\sum_{i=1}^{q}\left[\frac{(Z-y_i)}{Z}\right]^{2}$ ……(4)

By this index, the incidence, depth and severity of poverty can be identified

3.5.3Economic model specification

Choice of appropriate econometric model amongthe nature of the dependent variable. In this study, the dependent variable dummy (dichotomous),livelihood diversification represented (1=if household diversify) and (0 = if non diversify)and theoutcome variable of poverty status of rural households dichotomous represented (1 = poor)and (0 = non-poor).The appropriate

econometric model for such dependent variable would be linearprobability model, logit or probit(Liao, 1994; Sharma,1997,Gujarati 2005).

The linear probability model (LPM), which expresses the dichotomous dependent variable (Yi) as a linear function of the explanatory variables (Xi), may generate predicted value outside 0 - 1 interval which violates the basic tenets of probability (Gujarati, 2005). It may also violate the assumptions of homoscedacity of the disturbance term(Gujarati, 2005). The logit and Probit models will guarantee that the estimated probabilities will lie between logicallimit of 0 and 1.Both probit and logit analysis are well-established approaches in the literature to estimate dummy dependent variables.

The cumulative probability functions of the probit and logit models are quite similar, so they usually generate predicted probabilities that are almost identical. Logit, however, has the advantage that these predicted probabilities can be arrived at by hand calculator. Further, when there are many observations at the extremes of the distribution then logit is preferred over probit (Lia,1994).The logit and probit models are comparablethe main difference being that the logistic function has slightly fatter tails that is, the normal curve approaches the axis more quickly than in the case of logistic function.(Sharma,1997).

Even though the logit and probit models are comparable, Hosmer and Lemshew (1989) pointed out that a logistic distribution has got advantage over others in the analysis of dichotomous outcome variable. Similarly, Liao (1994) reported that the logit model has the advantage that these predicted probabilities could be arrived at easily. He also indicated that when there are many observations at the extremes of the distribution, then the logit model is preferred over the probitmodel.Also, Sharma (1997) reported that the logit model is computationally easier to use than the other type. The logit model was applied in this study to assist in estimating the probability of household participation in livelihood diversification activities that can take one of the two values, participated or not participated household. According to Gujaratithe functional form of the logit model is presented as follows;

$$p_{i=E}\left(\frac{Yi}{Yi}\right) = \frac{1}{1+e^{-(\beta 0+\beta 1x1)}} \quad \textit{(5)}$$

$$pi = E\left(\frac{Yi}{Yi}\right) = \frac{1}{1+e^{-zi}} \quad \textit{(6)}$$

Where Pi is a probability that aithhousehold participated in livelihood diversification and ranges from 0 to 1; Zi is a functional form of me explanatory variables (X) which is expressed as:

$$Zi=\beta + \sum \beta iXi, i = 1,2,3, \ldots \ldots . . m \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where; 0 β is the intercept and $i\beta$ are the slope parameters in the model. The slope tells how the log-odds in favor of a given household participating in livelihood diversification change as independent variables change. If *i P*is the probability of a household diversified, then 1- *i P* indicates the probability that a given household did not participate in any livelihood diversification, which can be given as:

$$1-pi=\frac{1}{1+e^{zi}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (8)$$

$$1\text{-}pi=\frac{1}{1e^{zi}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (9)$$

Dividing equation (8) by equation (9) and simplifying gives

$$e^{zi=\frac{pi}{1-}} = \frac{1+e^{z}}{1+e^{-z}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

Equation (10) indicates the odds ratio in favor/in terms of a given household participating in livelihood diversification. It is the ratio of the probability that a household will participate in livelihood diversification to the probability he/she will not participate. Lastly, the logit model is obtained by taking the natural logarithm of equation (11) as follows:

$$Li=1n\ (\frac{pi}{1-pi})=\beta 0+\beta + Xi \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

Where; Pi=the probability that Y=1 (that a given household is participating in livelihood diversification); 1-P *i* = the probability that Y=0 (that a given household does not participate in livelihood diversification); L=the natural log of the odds ratio or logit; *i* β = the slope, measures the Change in L (logit) for a unit change in explanatory variables

$$(X);\frac{pi}{1+pi} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

β = the intercept. It is the value of the log odd ratio.When X or explanatory variable is zero. Thus, if the stochastic disturbance term (U*i*) is taken into consideration the logit model becomes

Li = 0 1 $i\ \beta$ +βX +U I ……*(13)*

3.5.4Impact estimationpropensity score matching (PSM)

If diversification was by chance assigned to household, one could judge the impact of its livelihood diversification on households' poverty by comparing the average consumption cost of basic need approach identifying the non poor from poor based on diversified and non diversified.In such a case, the average treatment effect can be computed as follows:

ATT = E (Y1 | D = 1) - E (Y0 | D = 1) ……(14)

The assumption that the output levels of the participant /diversified before their engaging (E (Y0/D=1) can reasonably be approximated by the output level of non diversifiedduring data collection (E (Y0/D=0). Otherwise, estimation of a treatment using the above equation is not possible since we do not observe E (Y0/D=1) though we do observe E (Y1/D=1) and (E (Y0/D=0). However, diversification is hardly ever randomly assigned. Instead diversified usually occurs through self-selection of households choices to different actitivtie or, sometimes, through plan situation. In the presence of self-selection or plan situation, the above procedure may results in a biased estimation of the impacts of diversification since the treated group (i.e. the diversified household are less likely to be statistically equivalent to the comparison group the non- diversified in a nonrandomized setting.

τi = Yi (Di =1) − Yi (Di = 0) ……(15)

Where

tiistreatment effect (effect due to diversified);

Yi is the outcome on household i;

Di is whether household i has got the treatment or not (i.e, whether a household diversified or not).

In the absence of experimental data, the PSM is a widely used method to account for thesample selection bias,which is also employed in this study. The PSM technique pairs the

treatment (diversified sample household) and control (non diversified sample household) groups based on the similarity of observable character(Ali &Abdulai, 2010).

$\tau i ATT = E(\tau / D=1) = E[Y(1)/D=1] - E[Y(0)/D=1]$……………………………………...(16)

3.5.5. Multicollinearitydiagnostic tests

Before running binarylogit regressionmodel for ten continuous and two discrete explanatory variables were implying the presence or absence of a multicollinearity problem using Variance Inflation Factor (VIF) and contingency coefficient, respectively. The VIF for all the continuous variables were less than 10 and greater than one. Similarly, the result of the contingency coefficient test revealed that there is problem of association among the discrete explanatory variables were expected to affect the choice and acceptance of household livelihood diversificationstrategies regressed on the other continuousexplanatory variables and an evaluation was made on the coefficient of determination (R2 j). A popular measure ofmulticollinearity, the VIF is defined as:

$$VIF(Xj) = (1 - R2j)^{1} \text{…………………………………………………………………………} (17)$$

Similarly, there may also be aninteraction between qualitative variables, which can lead to the (18problem of multicollinearity or strong association.To detect this problem, coefficients of contingency computed from thesurveydata.

$$C=\sqrt{\frac{x2}{n+x2}} \text{…………………………………………………………………………………} (18)$$

Where;C is coefficient of contingency,

$\chi 2$ = is chi-square test and

n= total sample size.

The values of contingency coefficient range between 0 and 1, with zero indicating no association between the variables and values close to 1 indicating a high degree of association.

3.6 Definition of Variables and Working Hypothesis

Dependent variable: Household livelihood diversification is a dichotomous variable representing the household diversification taking value of (1= if household diversified and 0 otherwise). Livelihood diversification situation of a household is identified by the main livelihood activities pursuit by household who generated their income from only agriculture were considered as non diversified, while household who derived additional income from non-farm or off-farm activities were considered as participating in livelihood diversification. The right hand side variables include individual and household characteristics and asset endowments, dummy for diversification and the like. That means binary logit regression model was used where the dependent variablewithin the (1, 0)bounds .

Outcome variable;In order to examine the impact of livelihood diversification on household poverty; the study used a dichotomous which assumes a value of 1 for poor households and 0 for non-poor.This minimum level of expense required /AE was computed based on the amount of calorie requirement (2200kcal/AE/day) and minimum expenses needed for non-food items. It indicates whethera particular household is poor or non-poor.

Independent variables. As literature and different researches indicate, different variables affected livelihood strategies positively or negatively a variety of social, financial, physical institutional and demographic and personal preference factors. In this study those factors (variables) found to have influence in different empirical studies are included. Accordingly, variables that are positive/negtivlyassociated which livelihood diversification and reduce poverty is hypothesized based on their expected relationship.Thevariables wereaffecting the household livelihood diversfication statistical significant or not is followed;

Age of household head (AGEHHD): is a continuous variable as it is defined by the rate of continual age by the heads of household when measured in years reached since birth. Age is one of the factors to household participating to different livelihood actitivties. According to Khatun and Roy (2012) found that household with a younger head will have more desire and access to non-farm activities therefore has diversified livelihoods. Mariotti*et al.*,(2014) indicated as age increases and the household heads cross the turning point of approximately 60 years, it is less likely that the households would choose to have diversified livelihoods. In other ways, it is expected that younger household are more likely to be diversifiers of

livelihood strategies than the older household, that the older ones due to better possession of resources accumulation (land and livestock). Thus, it is hypothesized that older age of the household heads and diversification of livelihood strategies are negatively correlated.

Sex of household head (SEXHHD): is referring to the household head in terms of sex, where by the dummy variable 1 if the household head is male and 0 if female. The households headed by female are less likely to participate in off-farm activities. The possible reason is households headed by female have more responsibilities in home management.Opposite to this, male household heads have more tendency of engaging in different activities and then this improves their income. Men and women have different access to resources and opportunities and decision making (Ellis, 2000). Therefore, it is expected that the male headed households have better chance of diversify than the female headed ones.

Family size (FAMYSIZE): Family size is continuous and measured in adult equivalent members of the household who live together. A larger household size is positively significant with household income due to participate different off /nonfarm activities Family size either determines the availability of family labor or, large family size demands large amount of production to feed its members. In Ethiopian context larger households tend to be poorer (World Bank, 2005). The reason is that as the family size increases, the probability of the household to have more dependants and disguised unemployment increases. Opposite of this Tizale (2007) found that larger households divert their labour to different activities to generate more income and provide for their households. Therefore, the chance of a household choosing a particular livelihood diversification activity would increase with the size of the household. Therefore, a positive relationship was expected between livelihood diversification and household size.

Dependency ratio (DEPNDACY): This indicates the number of children under age 15 and old age of above 65 expressed in terms of adult equivalent as a ratio of total family size. As the number of dependants increases the active labor force (age15-64) beside themselves are obliged to support these dependants. Thus this leads to the share of resources and income obtained by the active labor force and hence .Having more young children in the household may mean there is less labor available for new activities as it raises reproductive burden. More children may necessitate greater income to support their basic needs (Galab*et .al*,

2002).and decline to the well being of the household in average terms.Thus the hypothesis is that a household with large economically non- active family members tend to be less income b/c of there is no participating to any activities Therefore, a negative relationship was expected between livelihood diversification and dependency ratio.

Educational level of household(EDU): This continuous variable and measured the number of schooling year achieved by the household head. The household head is usually the leader of the family that holds the share of decision making in the family. These decisions are usually related to the overall socio-economic activities and resource utilization of the household. This is probably because school education increases the human capital levels and provides the necessary skills which enable the entry into more remunerative labor markets especially for non-farm activities such as non-farm wage labor or self-employment. Idowu*et al.*(2011)point out education was foundto be a key determinant of the diversification of income generating activities. Households in which the average level of education is higher can be expected to have more members working off/non-farm .This variable is expected to have a positive impact on different livelihood strategies.

Land holding (LANDSIZE): This is a continuous variable and measured in hectares as indicating the total land size households owned. Land is the main natural capital for householdandin Ethiopia 85% of the population isagrarian the majority of farmers livelihood and well being depends on the available of farm land.Laver (2012) has indicated the very attachment of Ethiopian farmers to land. World Bank (2005) indicates land as one of the most important asset for rural households. Therefore, having more land size expected to affect livelihood diversification negatively. Since the farmer relay there is crop production in order to satisfy basic needs. Thus, this variable was hypothesized that households who have large farm land holding would have better probability to intensification crop production and commodity specialization than those smaller and smaller land size holders who probably participate in off/nonfarm activities.

Livestock ownership (TLU): This is continuous variable referring in the total numbers of the livestock resource measurable in TLU.The farming in the rural area is characterized by a mixed farming system whereby livestock production is also one of the means of livelihood. It is the second largest source of cash income for the rural households as indicated in rural

socio-economic survey report (MoFED,2012). The household having larger size of livestock can have better chance to have income from livestock. The more livestock owned household would be the less possibility the choice to participate in less incentive off/nonfarm activities. Therefore, the more size of livestock is expected to be negatively related to livelihood diversification activities.

Distance from local market (DISMAK): It is a continuous variable and is measured in minutewhich household spend time to sale their product to the market. If the household is located in a village or distance from the market, he/she is weakly accessible to the market. The closer to the market the lesser would be the transportation cost and time spent. A study conducted by Mohammed (2012) identified that distance from the far from market affected the quality of perishable products and injuring the livestock. Due to long distanceshigh transaction cost.On the other hand market access variables linked to transport accessibility, and ability to sell farm products in the market were positive affect determinants of livelihood diversification. Therefore, the nearestto market distances hypothesized thatpositively the probability of households diversifying their livelihoods.

Credit service (CIRDIT): This is a dummy variable which represent 1 if the household has received credit the last one year if 0 otherwise. Credit is a key financial instrument to break low level of production and then marketing problem. Households access to credit services and diversification in agriculture plus off/non-farm activities has found positive relationship. Davies (2004) identifies that lack of access to financial services or the lack of credit as a constraint to potential diversification into apart from farm economic activities.Providing the poor with small creditwith the hope of improving their labor productivity and thereby lead to increment in household incomes (Derje*et al* 2013). In order to reducepoverty and improve the living standard of the people.Therefore, the variable hypothesized thataccess tocredit positively affect livelihood diversification.

Frequency of extension contact (EXTEN): Frequency of extension contact is the number of times the household receive extension services contact within a year.As expected in this study the regularity of the extension agent's visit householdsduring participation activities has positive relationship. Home or farm visits by development agents is one of the individual extension methods helpful to bring about change on indusial behavior. Therefore, household

who have contact with development agents have better access to information on technology and the need for change, and hence have better possibility to change their intent into action (Tadesse, 2017). Hence, contact with development agents was hypothesized to have positive in influence on livelihood diversification.

Off-farmincome(OFFINC): It is continuous variables and measured in ETB.The households participating during off season after harvesting the agricultural production are engaged in the selling fire wood and agricultural wage employment food for work during the off season are expected to gain significant additional income to supplement their farm income purchasing different agricultural inputs and machineries. In the other hand, in earning more income andchanged livelihood of their family members and saving in differentproperties in cash and in kind.Karki*et al*(2004) identified off-farm income among the major factor that determines adoption of improved technology among farm household. Hence it is hypothesized that households engaged in these activity have a better chance improve their outcome.This indicates positive factors.

Non-farm income (NONINC): It is continuous variables and measured in ETB.Given the uncertainties surrounding crop production and the inadequacy of the returns to maintain the household for the entire year, many rural households engage in undertaking diverse activities in seeking additional income from sources other than agriculture The income households seek from the different income generated starting activities other than crop and livestock production.Abebaw (2003) has also indicated the significant impact of incomes towards household hence reduction in poverty from own business like; (petty trading, home-made drinks, handicraft weaving, blacksmith etc.)sources are analyze on the basis of participation in these activities and earning additional income for household .Therefore, hypothesized positive associated with livelihood diversification.

3.6.1Summary table of variables and working hypothesis

In the analysis the major determinant of rural household livelihood diversification strategies is a dichotomous response variable where value of (1and 0)representing1= if a household participating on the different livelihood strategiesotherwise 0.On the other hand the outcome variable its impact of household poverty representing 1=if household poorotherwise 0.The

independent variables included in the model from 12 variables 10 are continuouswhile twoof them aredummy variables. Therefore, assigning the household participation in livelihood diversification as the dependent variable, the following variables were selected to analyze whether they explain household's participation in livelihood diversification or not (Table 4)

Table 4.Summary table of variables and work hypothesis

Dependent Variables			
Livelihood diversification		**Dummy (1=if diversified , 0=if non-diversified)**	
Outcome Variable		**Dummy (HH poverty statues (1=if poor, 0= otherwise)**	
Independent Variables			
Variable	**Variabletype**	**Variable Definition / Measurement**	**Expected sign**
AGE HHD	Continuous	Age of household head measured in years	**+ve**
SEX HHD	Dummy	Sex of household head representing 1,male 0,female	+ve
FAM SIZE	Continuous	Family size in adult equivalent	**+ ve**
DEPENDRT	Continuous	The ratio of dependent to non- dependent in AE	-ve
EDU	Continuous	Education level of household head in year of schooling	**+ve**
LAND	Continuous	Land size in hectares	**-ve**
TLU	Continuous	Total livestock ownership in TLU	-ve
DISMAK	Continuous	Distance from local market center in miunet	+ve
CREDIT	Dummy	Access to credit, 1 if the household received 0, otherwise	+ve
EXTENSION	Continuous	Frequency of extension contact in day within month	+ve
OFFF INC	Continuous	Annual income from off farm activities in ETB	+ve
NON INC	Continuous	Annual income from nonfarm activities in ETB	+ve

***Source**: Field survey,(2019)*

4. RESULT AND DISCUSSION

This chapter discusses the descriptive and econometric results related to the research objective. It is organized into four sections. The first section presents the results of thedescriptivestatisticssample households characteristics and poverty measurements status of sample household inthe study area. The second section descried rural household livelihood diversification strategies by poverty status of sample household in the area.The third sectionthe empirical results of econometric analysis the determinant of livelihood diversification and finally in the last sections discuss the impact of livelihood diversification on household poverty.

4.1 Descriptive result of Sample household Characteristics

As can be seen from the descriptive statistics the maximum and minimum age of household head in the study area is 86 and 22respectively, and the mean age about 43.06 years while the mean family size of households is 5.09 in the study area .Whereas the mean year of schooling sample household is 3.25 in the study area.The mean annual off and non-farm income of the rural household in the study area is 2232.92 and 1662.26 Birr respectively and this account for about 51% of the mean annual income of the households. The household survey witnessed that, from the total of 385 sample households, 77.66% are male headed while the remaining 22.34% femaleheaded households. In addition to this, 84.94% married headed households 15.06% single.The majority 83.64% of the sampled respondents areMuslim religionfollowersand the remaining 16.36% are Christian. In the study area, the maximum and minimum land size of samplehousehold holdings are3.75 and0.125 hectares respectively. The mean livestock holding of the sample households in the study areas is about 2.52 when measured in tropical live units. This low livestock population in the study areas is associated with the scarcity of land resources owned by each households.

4.1.1 Status of poverty in the study area

The quantitatively poverty was estimated by using food and non foodexpenditure to set the poverty line. The food poverty line was determined by choosing a bundle of food typically consumed by the household in the study area such as,maize sorghum teff, pulses, Enset (kocho) potato, sweet potato vegetables, fruits, oil, milk,meatand others stimulus like coffee,

teaand caht. (Appendix table,3).Thequantity bundle of theses meets predetermined level of minimum calories requirement and valued at local prices average to get constant poverty line. The specific allowance for the non food spending pattern of the poor is added to the poverty line, the account for the non food expenditure the food poverty line is divided by the food share of the poor quartile.

Accordingly, the food poverty line calculated from the data was 2147.28 Birr(Appendxi 3).To this value, an estimated non-food share was added to obtain the total consumption poverty line per year per adult birr using the approach of (Ravallionand Bidani 2008).The resulting food share at the poverty line and estimate an allowance ofnon food poverty linethen the total poverty line in the sample household of the study area was 2887.1birr/year/AE.A food poverty line was constructed by valuing a bundle of food items providing 2200 Kcal/day/adult.

4.1.2Consumption expenditure and poverty status of sample households

The distribution of households by estimated annual consumption expenditure per AE was computed from the survey data.Annual consumption expenditure per AE for the whole sample households ranged from 1081.74 to 4135.29 Birr with a mean of Birr 2920.16 .The overall actual household consumption expenditure per AE in study area during survey 2019 clearly shows that the minimum subsistence requirement for most household was meet.The distribution of household consumption expenditure per AE compared to the minimum amountrequired indicated that 2887.1 Birr is required per adult per year in order to ensure survival. (Figure 4) illustrate thatamong sample household presented using the approaches specified and discussed in the methodology partconsidering the amount 2887.1birr as a benchmark,242(62.86%) were non-poor(able to meet the minimum subsistence requirement)and the remaining 143(37.14%) were poor rural household from 385 total sample household of the study area.

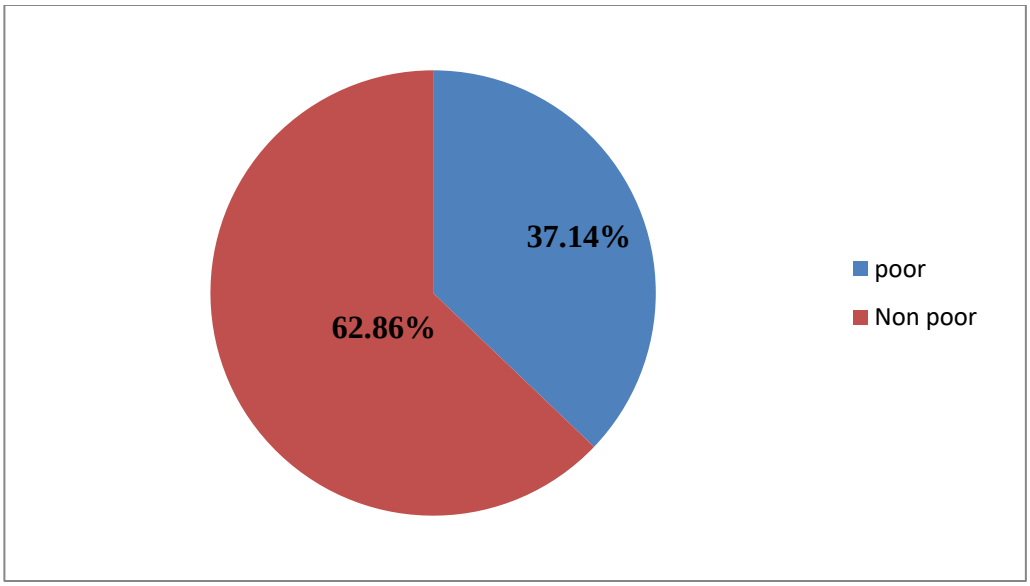

Figure 4: Poverty status of sample household ***Sources***:*computed own survey data (2019*)

These poverty lines the real per adult consumption expenditure are used to aggregate consumption poverty indices. This study revealed that, the current poverty line in the national level is relatively higher when we compare to the low range AE/year 2887.1 ETB with a higher and non food share. The national food poverty line for 2015/16 is computed to be 3772 Birr per year per adult person and the absolute poverty line is Birr 7184 per year per adult person and the share of pro-poor expenditure 65.7 percent andproportion of population below the poverty line is estimated to be 23.5% (MoFEC, 2015).This might be,either rural household spend most of their income on food, or due to increased price of the food items, or households might have shifted the non-food share of their expenditure to the food items or a combination of the factors.

Poverty analysis: The values for the poverty measures, headcount index (H), poverty gap index (PG) and $(PG)^2$Foster-Greer-Thorbecke P=0, p=1 and p=2 are presented in the headcount index (incidence of poverty) computed for the study area was 0.3714 implying that the proportion of the households whose the minimum requerment fell below the poverty line was 37.14% percent. The poverty gap index (depth of poverty) computed had a value of 0.0026, while the squared poverty gap index had a value 0.086, which depicts that severity of poverty in the study area was 8.6%(Table 5).The squared poverty gap index takes into

account not only the distance separating the poor from the poverty line, but also the inequality among the poor.

Table 5:Poverty measures for households in the study area (n = 385)

	Poverty measure	Value
P(0)	Head count (H)	0.3714
P(1)	Poverty gap (PG)[1]	0.026
P(2)	Squared poverty gap (PG)[2]	0.086

Source: Author's calculated own data(2019)

4.1.3 Livelihood diversification andvulnerability context by poverty status

Vulnerability context involves integrate and examine interaction between livelihood diversification and humans being their different asset in the study area .According to the focus group discussion due to limited other alternatives energy all of the rural households use forests and fire woods for cooking and heating, on the other for the construction of new houses and/or to repair the existing ones, andfor charcoal production purpose by estimation about 50%of forest is damage these major natural resources degradation affected household livelihood bases in the study area. Therefore, the declining is negative trend of forest in the study area is one cause of vulnerability context expose them to poverty trap in the area, then households adopt a variety ofthis difficulties is coping strategies in responseby participating different livelihood diversification.

4.1.3.1 Negative trends

Moreover, the household in the study area is frequentlyexposed to erratic rain, low crop productionand increasing vulnerable to predators, insect and diseases damage crop, beehive and like(monkey), lack of irrigation is the major challenge the farm household there is no diversified agricultural intensification thenexposed them less income from crop production.

On the other hand lack of employment opportunity for youth exposed to high dependency ratio major problem of the area. Almost all of group members agreed that the declining soil fertility is becoming reduced the agricultural production phase them to purchasing high cost food items from the market and low price fall of selling their product also another challenge of the study area. Dula (2011) mentioned that high dependency of rural people on rain fed

agriculture and limited irrigation practices worsen the vulnerability of the people to climate change.

4.1.3.2 Shocks and stressesexposed to risk sample household

The stated difficulties below on (Table 5) tied with other agricultural constraints pointed out earlier have the potential of generating negative consequences for the welfare of sample households. In view of this, households who experienced some form of difficulty.In the study area the main challengesare crop pests and diseases infestation like locust coffee diseases like coffee belie disease (CBD)and coffee seed disease (CSD).The result indicates on average about 72.72% are them reported crop pests and diseases are declined crop productivity of the area on the non poor 45.45% and poor side 27.27% (Table 6).During focu group discussion the participants strongly complained that due to crop pests and disease decrease the quality of coffee product and price fall on the market.

Livestock holdings are decline because of shortage of grazing land and feed.The resultindicatethaton average 29.86% are sample household due to lack of grazing lands, drinking water and veterinary services are exposed to the death of livestockthis indicated the non poor and poor 19.74% and 10.12%respectively.This implies the statically difference between exposure of livestock death and poverty status statically significant at 5% probability level.Households that experienced the death of a family member will have a challenge meeting the basic necessities of life.On the same thing the result indicated that in the sample household 20.77% exposed to death of family members (Table,6).

4.1.3.3 Seasonality exposures of sample household head

Theresult indicated in the study area about 76.88% sample household exposed to seasonal prices fluctuation coffee during harvesting time in the side ofnon poor49.09% and poor 27.79%respectively(Table 6).These exposures due to price is fluctuate frequent rise and fall of commodity prices changes in the market situations. Price fluctuation can be seasonal whereby the commodities changes during the harvestingseason of the year increase in surplus and demand situation has reached peak stage and challenging in the study area.Price fluctuation is a multifaceted problem attributed by various factors which, combined, culminate in dangerous

consequences for the most vulnerable.According to Devereux *et al* (2013) seasonal fluctuations prices are often dramatic and can strongly affect livelihood security then people are designed livelihood strategies,where possible to reduce seasonal income fluctuations and the associated vulnerability.

Additionally, thesurveyresult indicate that exposure of heavy rain reported by respondent 21.55% from this the exposed of non poor 13.76% whereas the poor 7.79% this implies the difference between the exposure of heavy rain and poverty statusstaticallysignificant at 5% probability level (Table,6).In the study areadue to the minimal irrigation in the farm household is depending on rain feed agricultural. During group discussion the participant hasshow that engagements in non/off farm activities are mostly seasonal and done on off time basis. Due to minimal irrigation in the farm household is depending rain feed agricultural there is no produced market orientated commercial agricultural production and cropspecialization due to these on farm extensive agricultural production low and they phased low income from crop production to exposed them high cost of food price in the market during the off season.

Table 6:Vulnerability context of sample household by poverty status

	POVERTY STATUS			
Vulnerability context	**Non poor(N=242)**	**Poor(N=143)**	**Total (N=385)**	
	%	**%**	**%**	**$\chi 2$**
Death of family members	10.9	9.87	20.77	4.639**
Death of livestock	19.74	10.12	29.86	0.732**
Drought exposure	3.89	3.11	7.00	0.663
Flooding Exposure	3.89	1.55	5.44	0.699
Conflict (grazing)	3.37	2.33	5.70	0.141
Fire exposure	2.85	1.55	4.40	0.260**
Exposure heavy rain	13.76	7.79	21.55	0.452**
Price fall of cash crops	49.09	27.79	76.88	0.542
Crop pest and disease	45.45	27.27	72.72	0.283
Damage of road	8.05	4.93	12.98	0.018**
Animal disease	12.20	8.05	20.25	0.283*

,* represented at 5% and 10% probability level ***Sources; computed own data (2019)*

4.1.4 Livelihood capitals/assets

Different researchers agreed that mainly there are five types of livelihood assets Murray, (2001) indicated assets as material and social. Some of the key resources that therefore need to be looked into measuring poverty include human capital, social capital, natural capital physical capital and financial capital.

4.1.4.1 Human capitals

Human capital is a collection of traits all the knowledge talents, skills, abilities, experience, intelligence, training, judgment, and wisdom possessed individually and collectively by individuals in a population. These resources are the total capacity of the people that represents a form of wealth which can be directed to accomplish the goals of the nation or state or a portion.The main indicators of human capital in this study areage,family size, dependency ratio, education level of householdhead.

Age of household head: is one of the human capitalsthat useful to describe households and provide evidence about the age structure of the sample and the population.The minimum and maximum age of sample household is 22 and 86 years, respectively.As indicated in(Table 7)the mean age of sample households were43.06years. Also the mean age of non poorand poor households were 43.26 and 42.73respectively.The result show that themean difference between age and poverty status statically significantat 5%probability level.

Family size of the household: The large family size needs more resources for sustenance than a small family. People with big families will venture in to as many ways as possible to gain the required resources to support their families. The minimum and maximum size of the family for the each sample household was found to be 2 and 13 peoples respectively. The total mean of family size sample household 5.09.The mean difference between nonpoor and poor household of family size5.06 and 5.14 respectively.Based on the study results the poor tends to have higher household size.This result indicatehere is nostatically significant between family size and poverty status.(Table 7)

Dependency ratio:The survey result shows that the proportion of economically non-active persons to economically active person.Economically non-active (dependent members) in the

age below15 and above 65.The result of (Table 7) show that non poor and poor ofnon active group 0.80 and 0.91 respectively. This indicatespoor have high dependency burden.The resultrevealed that the mean difference between dependency ratio and poverty status ofsample household statistically significant at less than 1% probability level. The result shows that high burden independency ratiotends a household to be poor.This could be due to presence of high composition of non productive age groups in the household.

Education level of sample household: Educational attainment has been identified as one of the most important determinant of knowledge and skilled earning.Literate individuals are very ambitiousto get information and use it and it also determines the capability of finding a job.The study resultrevealed that theoverallmeanyear of schooling sample households were 3.25 and thenon poor and poor sample household were 3.36and 2.93 respectively.This implies the mean difference betweenyear of schooling and poverty status of sample household statically significant at 10 % probability level(Table,7).

Marital status of household : The survey result indicates that from the total sample household majority of 84.94% are married and the remaining 15.06% are single. The marital status of the sample household affects the livelihood diversification activities because of both maleand female participating in the different off/nonfarm activities by discussion each other. The result of (Table 8) shows that among the married sample household 54.29%were non poor, whereas 30.65% were poor.On the other hand among single sample household 6.49% of them non poor whereas 8.57% are poor. Regarding, it's the chi-square test result that there is no statistically significant between marital status and poverty status of sample households.

Sex of sample household: is one of the variables that can determine livelihood diversification on sample households. The study indicated from the total sample household the majority of 77.66% were male and the remaining 22.34% were female. The result also indicates that non poor and poor sample households 49.09 % and 28.57% male headed respectively. Whereas female headed found in the non poor and poor categories 13.76% and 8.57% respectively.This indicate in household level the gender role of participating income generating activities the male household headare higher than as compared to a low percent for the female counterparts this indicates the role of gender to wealth distribution and the diession making of resource

attributed more in male headed than female headed. The chi-square testindicate that differences between both sex and poverty status statically significant at 5% probability level(Table,8).

Religion of household heads: Religion is the important affecting livelihood diversification in the sample households. The survey result revealed that the majority 83.64% Muslim sampled household 52.20% of them non poor and 31.43% were poor groups. Whereas from 16.36% Christians sample households, 10.65% them non poor the remaining 5.71% were poor groups. Based on the result indicted the number of Muslim non poor were higher than the poor religion followers. In the other hand the number of Christian non poor are higher than those poor groups. The result indicates there is no significantly difference between religions sampled households and poverty statues (Table, 8).

4.1.4.2 Social capitals

Social capital such as social position,networking ,association and culture are important drivers of livelihood diversification .Membership to social groups within the community is one way of creating social networks. These networks are beneficial in obtaining knowledge that can be used to furtherlivelihood. The sample household of the study isparticipating in different social and local network like relevant agricultural information, membership of Iddir, meetings linking different information, self help groups like (dadod and dabbo) during house construction and harvesting period. According toTache and Irwin (2003) in many Ethiopian society one of the benefits of being member in a community is the access it provides to the labour of other community members on a non-cash basis membership to social groups within the community is one way of creating social networks and beneficial in obtaining knowledge that can be used to further livelihoods.

Iddir ;the membership enables to help each other's solve internal conflict, and thus, reducing powerlessness and sudden problem during death and other problems .The result indicted from the total sample household 73.76% were the members of Iddir, out of this result 57.92% were non poor and the remaining 15.84% were poor sample household, respectively. There are big differences the social obligation and working together increasing production to the household

of the study area. The chi - square result indicate significant difference between Iddir and poverty status at5% probability level (Table,8).

Share cropping: share cropping the main factors neagoaitionbetween the land owner and other land less household share cropping agreement due to different reasons when the household live other place or health case sharing their land for other relative people. The study result indicates among the total sample household 65.96% were share cropping this impliesin the non poor group 43.37% whereas the poor group 22.59%.The chi squareresult show that there is no significant between crop sharing and poverty status (Table 8).

Cooperativesmembership:as households become membership in cooperatives leads to increase participating in livelihood diversification.In the study, area one of the important factors unionof coffee (Walidaa) are found to be the most important social assets in the study area during selling time. The result of (Table 8)showsthat from totalsample household 62.32% were on average the membership of coffee union this indicate 40.51% of them were non poor and the remaining21.81% were poor sample household.The result indicates there is no statically difference between cooperatives and poverty statues.Ellis (1998) indicate social capital such as social positions, networks,associations, religion and culture are important drivers of livelihood diversification.

4.1.4.3 Natural capitals

Natural capital variables included in this study are land ownership, irrigation access and forests., evidently play critical roles in the livelihoods of rural households.The immediate connections to the livelihood framework natural capital: such as access to land, grazing land, water, forests, and so on and to the set of activities that comprises the occupational portfolio of the household. Land isa being natural capital and valuable asset for the rural poor. People need the land for agriculture, to build homes and as a base for their small-scale businesses and non-farm activities. Land size is significantly and negatively related to livelihood diversification strategies (Yenesew .*et al*, 2015).

The key informants stated that the main means of accessing lands in the study area are acquisition from government land distribution, family gift, inheritance, crop land sharing the main means of accessing farm to those landless households they also stated those landless

households shared in land from farmers who have land to cultivate the lands. The share cropping agreements are held between the negotiating parties and local mediators depending on the crop amount of harvesting equal distribution based on crop type to be grown.

Land size of household head:People need the land for agriculture, to build homes and as a base for their small-scale businesses and non-farm activities. The study result indicate that minimum and maximumarea coverageland sizeof sample household on the range of 0.125 to 3.75 hectares including farm land, coffee land, forest land, Eucalyptus land and grazing land in owned by sample household.The overallmean land sizes were 2.00.the mean land size betweennon poor and poor sample household were2.19and1.66 respectively.Thisimplies the mean difference between landholding and poverty status statistically significance at 1%probability level.Similarly,the resuult show that from the total sample household 62.08% of non poor and32.21% poor household answered they have own land. This result support the country level study by (MoFD, 2012) those who have large land size are depends on agricultural activities alone whereas households with smaller mean land size are engaged in off/non-farm livelihood activities.

4.1.4.4Financial capitals

Financial capital includes credit, saving and various incomes earned by the household during the survey period.There are two indictors whether the household received credit from formal financial institutions (such as banks micro-credit institutions) and whether the household borrowed from relatives and friends The main indicators financial capital of household participating in the study area is income from the cash crops (coffee, chat, fruit, and honey) Off farm(selling charcoal, petty trade and causal labor) from nonfarm(hand craft remittances and wavering) was the main sources of income generating activities This is because a large amount of saving enables the rural households to invest in non-farm activities.

The key informants indicate that due to their lack of key assets (coffee land, livestock) which complicates their access to microfinance institutions and collaterals for borrowing money from local institutions tend to engage more in regular off-farm work .During group discussion the household stated we went borrow money but there high interest ratesworryingand due to lack of business training before starting any business activities.According to Simtowe&

Zeller(2006).with an option of borrowing, a household can do away with inefficient risk reducing income diversification strategies and concentrate on more risky but also moreefficient investments.

Annual off and nonfarm income: Income earned from different activities is an important variable, which determines of sample household livelihood diversification in the study area. The surveyresult indicate that the mean annual income of off farm activities non poor and poor 2571.89 and 1826.90 ETB,respectively.Whereasthe mean nonfarm annualincome of non poor and poor sample household 1826.90 and 1507.37 ETBrespectively.This show that sample household additional income earning activities from the various types of off/nonfarm activities pursuit this include(petty trade, causal labor, trade of farm products and live animals) on the side of off farm activities while (handcrafts, weaving/spinning, selling traditional medicine, sale of local drink (qaribo), rent of pack animal like donkey and horse and motor cycle and remittance).The result of (Table,7)show that the mean annual income from nonfarm and poverty status statically significant at 10% probability level.Thisresult also agree with the existing literature, which says nonfarm sources contribute 40–50% on average to rural household incomes across the developing world (World Bank, 2008). On the other hand, there is no statically significant between off farm income and poverty status.

Access to credit service: credit for the purpose of consumption or purchase of improved agricultural technologies or inputs, etc would improve the income of sample household Sources of credit in the study areainclude rural micro finance institutions,OromiaSaving and Credit Share Company (OCSSCO).The result indicated that from the total sample household among 42.59% were credit received from the different relative places or regular credit institution like OCSSCO (waaoliqo).The result shows that from the total sample household 27.27%non poor and the remaining15.32% were poor sample household (Table 8).This might be true, if households especially those who have limited land size easily access the financial services can increase their income source.

Saving: is one of the financial capitalsmotivate rural household participating in livelihood activities.In the study area the women's membership they have weekly saving and deposit on the local institution anddistributed during holiday used for different home purposed.The study indicate from total sample household among 83.12% wassaving their money individually.The

result show that the non-poor sample household were 52.47%and the remaining 30.65% are and poor sample household. The chi squareresult shows that there is no statically significant between both financial capital (credit and saving) and poverty status. (Table,8)

Suggestion of the key informant age of 50 year old clarifies the borrow money from different institution as"I was went to borrow the money from OCSSCO (waoliquo) but when I received the money what I do because still there is not attend any business activities training I worry high interest sell my house on the future others my relatives borrow the money they selling their asset and repay due to the high interest".

4.1.4.5 Physical capitals

In the study area, physical capital includes livestock, infrastructures facilities (like distance of school, health centers,portable water,distance local market, distance from residence all whether road),type of housing and different home assets like (Radio, Television Motor cycle, Cart, Bajaj and Grind mill).The main road and market distance is the important factors in the rural area. During group discussion the participant stated that main big challenge the area due to lack of accessible roads there is no effectively movement input and outputs due to high transaction cost.

Livestock holding*:* as a part of the mixed farming system contribute greatly to rural household economy. Cattle, shoat, donkey, chicken and beekeeping are kept by rural household as income source, draft power and food purpose in the study area. In view of this, measured of livestock holding of the sample households was taken and descried to assess the relationships between livestock ownership and poverty.The study result shows the mean livestockownership of households is 2.52 based on the numbers of tropical live unit (TLU).This indicates that, households have less number of livestock are engagein different livelihood activities as compared to those households who have owned more number of livestock.The result on (Table 7) shows that thenumber of livestock ownedbynon poorand poorgroups of sample household was 2.83 and 1.96respectively. This implies the mean difference between livestock and poverty status statically significant at 1% probability level.

Distances from local market: The infrastructure variables, distance to the nearest local market significantly affects the probability of participate in non/off-farm activity because markets will promote the rural-urban vertical linkage in which the farm household can supply the products to the nearest market place. In the study area the overallmean market distance was28.48 minutes. The (Table 7) below shows that the mean of market distances non poor and poor 25.38 and 33.73, respectively.Market is the stimulated and motivated household to participating livelihood activities. According to key informants this is because an easy access to roads and market facilitates movement of farm inputs and outputs in a cost effective way, which makes households engaged in profitable and attractive nonfarm activities. The result show the mean difference between distance from local market and poverty status statically significant at 10% probability level.

Housingtype sample household: Housing is one of the basic needs of human being and an important physical asset providingshelter. Types of construction materials and number of rooms are often used as an indicator ofa house quality and wealth of rural households. The data was indicated the ownership and quality of housing such as construction materials and quality. The result of (Table,8)depicted that95.84% of the total household are living in corrugated iron sheet roofed house of their own andonly 4.16% are owned and lives grass roofed houses. This result implies that difference between housing type and poverty status statically significant at 5% probability level.This argument agree with poverty study in Ethiopia by Woldehanna and Alemu (2002), showing that one-fourth of the household in rural areas were living in houses with corrugated iron sheet. This study shows that above three fourth of the rural householdsis live with corrugated iron sheet roofed house.

On the other hand the result indicate non poor of sample household have physical asset like television, radio, telephone, motor cycle and grind mill using for different home purpose and income generating for wealth accumulating and changing their living standard .This indicated participating of different livelihood diversification change the sample household asset ownership participating different livelihood diversification changing their living and have asset ownership in the study area. The chi- square result indicates that there is no statically difference between different assets and poverty status (Table 8).

Table 7Descriptive results of continuous variables by Poverty status

	POVERTY STATUS						
Variables	**Non poor (N=242)**		**Poor (N =143)**		**Total (N=385)**		
Human capitals	Mean	SD	Mean	SD	Mean	SD	**t-value**
Age of household	43.26	12.11	42.73	13.81	43.06	12.75	3.1154**
Family size	5.06	2.24	5.14	2.16	5.09	2.21	0.237
Dependency ratio	0.8	0.71	0.91	0.68	0.87	0.7	1.064***
Education level	3.36	2.63	2.93	2.48	3.25	2.57	0.2023*
Natural capital							
Land size	2.19	1.64	1.68	1.26	2.00	1.53	11.400***
Financial capitals							
Off farm income	2571.89	1830.29	1950.73	1635	2232.92	1761.66	2.204
Nonfarm income	1826.9	1668.25	1507.37	1663.81	1662.26	1668..25	0.002*
Physical capitals							
Livestock owner	2.83	2.14	1.86	1.35	2.52	1.92	0.34***
Market distance	25.38	17.69	33.73	15.28	28.48	16.3	3.7064*

***,**,* representsignificant at 1,5 and 10% probability level

Sources: *computed own survey data (2019)*

Table 8:Descriptive Results of dummy Variables by Poverty status

POVERTY STATUS					
Variables		**Nonpoor(N=242)**	**Poor(N=143)**	**Total (N=385)**	
		%	**%**	**%**	**χ2**
Human capitals					
Marital status	Married	54.29	30.65	84.94	
	Single	6.49	8.57	15.06	1.0392
Sex of HH	Male	49.09	28.57	77.66	
	Female	13.76	8.58	22.34	0.40**
Religion	Muslim	52.2	31.43	83.64	
	Christian	10.65	5.71	16.36	3.0756
Social capital					
Iddir		57.92	15.84	73.76	4.43**
Share cropping		43.37	22.59	65.96	0.1
Cooperative		40.51	21.81	62.34	0.26
Financial capital					
Credit		27.27	15.32	42.59	0.166
Saving		52.47	30..65	83.12	0.058
Physical capitals					
Housing type	Grass roof	0	4,16	4.16	1.468**
	Iron sheet	65.56	30.28	95.84	
Radio		38.44	20.77	59.21	1.0115
Television		15.06	9.61	24.22	0.1759
Telephone		44.93	27.53	72.46	0.1316
Motorcycle		9.09	0.78	9.87	1.8882
Cart		0.52	0	0.52	1.188
Bajaj		0.26	0	0.26	0.5924
Grain- mill		0.78	0	0.78	0.0188

****,** represented significant at 5% and probability level

Sources: *computed own data (2019)*

4.1.5 Polices and institutional services of the study area

In the study area the policewhich influence farmers are agricultural extension service and health extension services. Others local institution operated by the communities cultural norms laws and religions. The result indicated from total sample household maximum and minimum

days they could not participating any agricultural activities due to the holiday, religion and norms within amonth are13 and 4 days respectively. Institutions also formal and informal mediate in sustainable livelihood .According to (DfID 2000), the PIP the level of government institution and publics polices as well as private sector practices and policies and civic cultural and economic institution that operate in the society.

Frequency of extension contact: Frequency of extension contact was another important factor the numbers of days with in monthcontact. The total mean of extension contact of sample household were 2.50.It was found outthat the contact of non poor and poor 2.65 and 2.25 respectively.Proportionally, those household diversifiedtheir livelihood activities.The result implies the mean difference between frequency of extension contact and poverty status significant at 5% probability level.This show thatsample householdreceived information from extension agenteffectively.Furthermore the result indicated the average of health extension servicesamong 97.4% of sample household. The results indicatenon-poor were 60.26% and the remaining poor 37.14%were sample household. The chi-square testindicated the existence of statically significant difference between health extension and poverty status at 5%probability level (Table,9).

Table 9.Policies and institution by poverty status

POVERTY STATUS							
Variable	**Non poor(N=242)**		**Poor (N=143)**		**Total (N=385)**		
Continuous	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**t- value**
Extension contact	2.65	1.17	2,25	1.18	2.50	1.19	10.43**
Dummy variable	**%**			**%**		**%**	**χ2**
Health extension	60.26			37.14		97.40	6.0667**

, represents significant at 5% probability level ***Sources; own survey data (2019)*

4.2 Status of Livelihood Diversification in the Study area

Livelihood strategies may focus on increasing the range of assets to which a person or household has access, or on increasing access to particular types of capital.The result (figure 5) below indicated that in the study area the majority (6l.04%) of the household were able to

diversify their livelihoods into either of the three livelihood diversification strategies or combined income activities, whereas (38.96%) of the sample households were unable to diversify their livelihoods, often lacking the means to engage in any form of income-generating activity

Agricultural production and productivity is being challenged by the continuing drought occurrence coupled with limited farm and grazing land poor usage of agricultural improved input and other could be absence of basic amenities lack of motivation and interest agricultural activities.The negativeimpact onfood security and poverty on the household and may also be severely affecting the predicted rapid population growth in the future.As a result of this and other factors, the agricultural sector could not absorb the rural productivelabor force. In reverse, it aggravates the already unbalanced farm livelihood situation of the study. According to Kassie*et.al* (2017)due to the declining size of farm land coupled with the high population growth could have a potentiallynegative impact on rural welfare and food security in Sub-Saharan Africa.

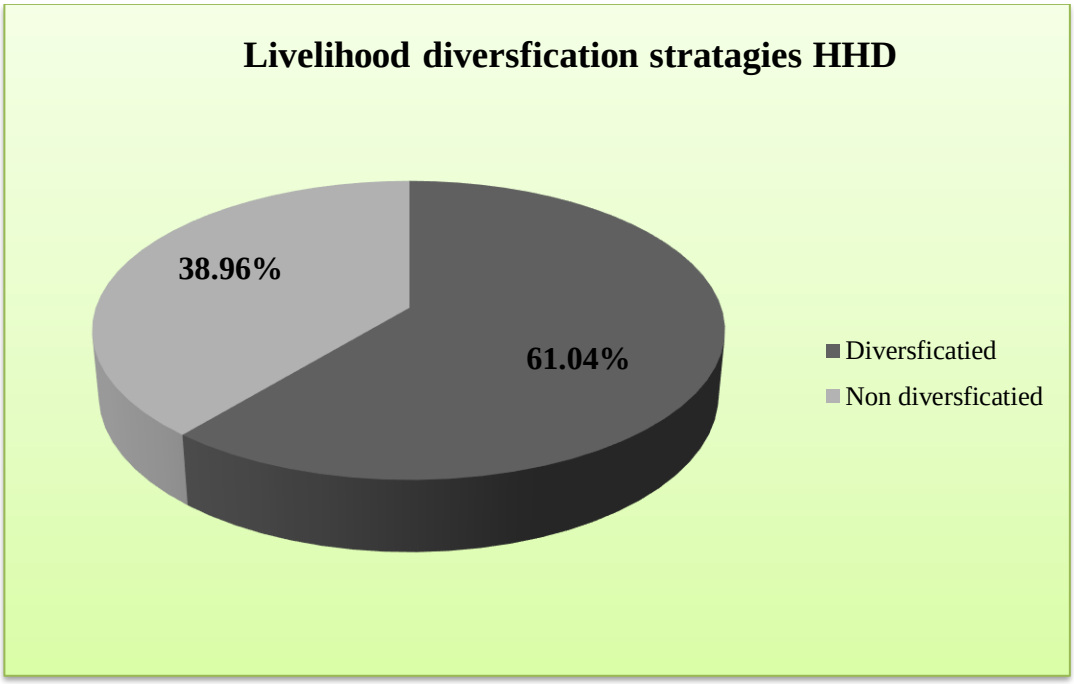

Figure 5**:** Sample households livelihood diversification ***Source****:computed own result, (2019)*

4.2.1Livelihood activitiesengaged by sample household in the study area

The result indicated that food crop farming and rearing of animal still continue key role in the livelihoods of rural households of the study arearespective of its shortcomings poverty alleviation. Food crop farming in consists of a variety of agricultural products was about 38.96 %of the households are engaged in their primary livelihood activity.These are fruit,vegetables and cereals thus making it possible for interested household to produce on regular basis and coffee, chat and honey sources income for household. Similarly, majorities 61.04% of sample households have been involved sources of income addition to farming off and nonfarm activities petty trading; causal labors and buying and selling of agricultural goods.This also forms an important different multiple income generating activities for sample household.

Mostlyhousehold who buy on market days and in turn sell during non-market days from the agricultural goods include fruits, cereals and live animals On the other hand,consumption goods buy from the town and selling to the nearest districtsuch as edible oil sop, salt and fuel, selling of traditional medicinehandcrafting and other income generating activities pursuit bysample household such as collecting rents and regular salaryallowance and remittances inthe study area (Table,10).

Table 10.Major livelihood strategies engaged by sample households in the study area

Livelihood Activities	**Frequency**	**Percentage (%)**
Agricultural (crop & livestock)	150	38.96
Causal wage labors	27	7.02
Firewood and charcoal sellers	7	1.81
Wavering and Handcrafting	29	7.53
Petty trade	56	14.54
Rent of motor cycle, draft animals	12	3.12
Remittance	35	9.09
Government allowance salary	23	5.98
Selling of traditional medicine	6	1.56
Grind mill (Weafichoo)	3	0.77
Others	37	9.62
Total	**385**	**100**

***Source**: Computed own surveydata(2019)*

4.2.2. Livelihood diversification and livelihood capitals

The result presents the descriptive statistics with means differences betweenselected variables and households who diversified and non diversified their livelihoods.The results show that significant difference is observed in terms of age of household head, family size, year of schooling sample household head, livestock ownership,land holding of households total annual cash income off/nonfarm, alsodiscrete variables in terms of access to credit service, housing type and others physical capitals owned by sample household significant mean difference between livelihood strategies.The result of(Table11)indicate that overall mean differences between livelihood diversification and age sample household were 43.06. The mean value age of sample households who were diversified their activities were relatively 43.25 whereas the non diversifiedsample household 42.78. This implies thatstatically difference between age and livelihood diversification significant at 10%probability level.

The result as (Table 11) indicate themean differencefamily size of the sample householdwho are participating different livelihood activities were 5.61 by adult equivalents. Whereas the non participate any of livelihood activities rather than agricultures were 4.28.This implies that sample households, diversify livelihood, have relatively more size than non diversified and significant at less than 1%probability levels.Farther more the sample household heads education level in year of schooling the mean difference between those sample household participating on livelihood activities is higher than those non diversification 3.51 and 2.85, respectively.This implies education and livelihood diversification significant at 5% probability levels.

The study results show that those diversified household who as their livelihood had relatively better total annual cash income than the non diversify. The total mean value of annual income off farm and nonfarm income were 2225.29 and 1262.70 birr, respectively.While the mean income of diversified sample household from off farm and nonfarm was 2499.90 and 1407.93 birr respectively.Whereas, the mean income of non diversified sample household was 1950.68 and 1117.46 birr relying on farm alone to drive their livelihood respectively (Table,11).

The study result indicates that the total meanlivestock ownership TLU ofsample household were 2.52, the mean of livestock ownership diversified and non diversified sample household

were 1.86 and 2.93respectively. This indicates that,those households who have owned less number of livestock's was engaged in different non/off-farm activity as compared to those households have owned more. The t-testresult indicates the existence of statistically differencebetween livestock ownership and diversificationsignificant at less than1% probability level. Farther more the total mean hectare ofland size sample household 2.00.Whereas between the diversified and non diversifiedsample household1.78 and2.35 respectively.The result shows that themean difference between land holding and livelihood diversificationexistence of statically significant less than at 1%probability level. On the other hand the mean difference of distances fromlocal market diversify and nondiversify sample household 31.27 and 24.11 in minutes respectively.There is no staticallysignificantdifference between livelihood diversification and market distance (Table 11).

Table 11.Descriptive result of continuous variable by livelihood diversification

	Livelihood Diversification						
Variables	**Diversified (N=235)**		**Non Diversified (N=150)**		**Total (N=385)**		
	Mean	SD	Mean	SD	Mean	SD	t-value
Human capitals							
Age of HH	43.25	13.42	42.78	11.68	43.06	12.75	3.42*
Family size	5.61	2.34	4.28	1.71	5.09	2.21	16.88***
Dependency ratio	0.83	0.7	0.94	0.7	0.87	0.7	0.001
Education level	3.51	2.72	2.85	2.27	3.25	2.57	5.61**
Extension contact	2.43	1.18	2.60	1.19	2.50	1.19	0.0032
Natural capital							
Land size	1.78	1.34	2.35	1.73	2.00	1.53	11.98***
Financial capitals							
Off farm income	2499.90	1954.24	1950.68	1361.66	2225.29	1657.95	18.31***
Nonfarm income	1407.93	1807.26	1117.46	1271.36	1262.70	1539.31	20.95***
Physical capitals							
Livestock owner	1.86	1.69	2.93	2.18	2.52	1.92	12.18***
Market distance	31.27	16.69	24.11	16.95	28.48	17.29	1.00

***,.**,* represented at 1,5 and 10% probability level ***sources**: own computed survey data (2019*)

The chi-square test indicated the existence of statistically significant difference between the livelihood strategies in terms of discrete variables. More specifically, the test revealed that there are a significant difference between the livelihood groups in terms of access to credit

service, marital status,religion, different asset like (housing type mobile telephoneand television)of sample household at less than 1% probability level .on the other hand social capitals in terms of Iddir, sharecroppingmembership of cooperatives and livelihood diversification significant at less than 1% probability levels (Table 12).

The survey result show that the avege of between sex of sample household and livelihood diversification this indicate 44.41% and 16.62% male and female diversify the remaining 33.24% and 5.73% male and female non diversify respectively. As observed in the tradition of the study area, gender disparity the ability of female-headed households to participate in off-farm income generation activities. The chi^2 indicatethe existence of statistically significant difference between livelihood diversification and sex of sample householdat1%probability level (Table,12)

The result indicated that the averagecredit received of sample household 61.04% on the other hand the result indicate between diversified and non diversified 38.70% and 22..34% respectively. This implies statically significant between diversification and credit service at 1% probability level.Additionally saving one factors of finical capital for livelihood diversification the result indicate that on overall 83.12% sample household saving habit from this 51.95% were sides of diversified household whereas from the side of non diversified were 31.17%. The result of (Table,12)shows that there is no significant difference between saving and livelihood diversification.

Table 12.Descriptive result of dummy variable by livelihood diversification

Variables		Livelihood diversification			
		Diversified (N=235)	Non diversified (N=150)	Total (N=385)	
		%	%	%	χ^2
Human capitals					
Marital status	Married	54.54	30.4	84.94	
	Single	6.49	8.57	15.06	9.23***
Sex of HH	Male	44.41	33.24	77.65	
	Female	16.62	5.73	22.35	8.33***
Religion	Muslim	46.57	37.14	83.90	
	Christen	14.28	1.89	16.10	26.09***
Social capitals					
Iddir		48.83	37.66	86.49	21.77***
Share cropping		35.84	29.35	65.19	11.45***
Cooperative		34.81	27.53	62.34	7.26***
Financial capitals					
Credit		38.70	22.34	61.04	8.88***
Saving		51.95	31.17	83.12	1.7013
Physical capitals					
Housing type	Grass roof	0.52	2.27	2.79	
	Iron sheet	60.59	36.62	97.21	8.745***
Radio		36.1	23.17	59.27	0.0013
Television		21.3	3.37	24.67	33.88***
Telephone		46.48	25.97	72.45	4.144***
Motorcycle		5.45	1.81	7.27	0.5914
Cart		0.52	0	0.52	0.1030
Bajaj		0.26	0	0.26	1.5707
Grain- mill		0.78	0	0.78	0.0403

***,.**, represented at 1and,5% probability level ***sources**: computed own surrey data, (2019*)

4.3 Determinant of Rural Household Livelihood Diversification in the Study area

Binary logistic regression model was utilized to identify determinants of rural households' choice of livelihooddiversification strategies.The model wasselected based on the justification illustrated earlier in the methodological part. A binary logistic regression wasrun, results of which arepresented in (Table 13).

4.3.1 Model fitness

The result of the maximum likelihood estimates are presented in the (Table 13). The value of Pearson chi-square indicated the goodness of fit for the fitted model. The likelihood test ratio statistics indicated by the chi -square statistics is highly significant (sign = 0.0000) suggesting

strong explanatory power of the model. The variable estimates of the binary logit model giveregression only the direction of the effect of explanatory variable on the dependent variables. From the logit model approximation of variables only deliver the direction of the effect but not reflect the actual magnitude or unit probability change of the independent variables on the dependent variable.Therefore,statisticallysignificant unit probability change might be measured only through the odd ratio from the logit model (Greene 2003)

4.3.2 Multicollinearity diagnostic in binary logit model

The study address the ensuring of multicollinearity diagnostic methods is applied .The result of Variance Inflation Factor **(**VIF)in the indicatedof allvariables have the value of VIF less than 10 which is indication that there is no problem of multicollinearity among the continuous variables of this study.As a rule of thumb, if the VIF of a variable exceeds ten which will happen if R^2 exceeds 0.90, that variable is said to be highly collinear (Gujarati, 2004). In the same way it is necessary to test whether there is or not interaction between discretevariables that can lead to problem of multicollinearity or association using contingency coefficient (C).As a rule, C value of 1 indicates higher association and a value of 0 indicating no association. In the study, the test result has indicated that there is no problem of association among the dichotomous variables included in the model. In this case, the null hypothesizes (Ho)constant variances variable fitted value of diversification (Appendix table 5&6).

4.3.3. Model result and discussion of economic variables

Thus, the binary regression model result depicts that among of 12 hypothesized variables sixvariables sigunifcant that means 50% of the hypothesized variables (family size of the household head, education level of the household, credit service, off farm income of household,land size and livestock ownership) were found to be influencing the determinants households livelihood diversification strategies positively and negatively at 1% 5% and 10% significance level(Table, 13).

Table 13.Logitic regression of the determinants of livelihood diversification

Diversified HHD (N=235)Non diversifiedHHD (N=150)				
Variables	**Coefficient**	**Odds Ratio**	**z**	**P>z**
Sex of sample household	0.398855	1.271104	0.97	0.334
Age of sample household	0.0022859	1.002289	0.24	0.811
Family Size	0.3254973	1.384719	5.29***	0.000
Dependency ratio	-0.0991398	0.9056161	-0.60	0.552
Educational level	0.07415	1.102318	2.07**	0.039
Credit services	0.9661014	1.62768	3.68***	0.000
Land Size	-0.1440323	0.8658598	-1.70*	0.089
Extension contact	0.1218438	0.8852866	1.16	0.247
Distance of market	-0.0012969	0.998704	-0.41	0.683
Livestock holding	-01426449	0.8670619	-2.13**	0.033
Off farm income	0.000307	1.000307	1.92*	0.055
Nonfarm income	0.0000661	1.000066	1.20	0.232
Constant	-2.48189	0.0835851	-2.84	0.004

Number of obs = 385Pseudo R^2 = 0.1528
LR $chi^2(12)$ = 78.66 Log likelihood = -218.07066
Prob> chi2 = 0.0000

***,**,* Significant at 1%, 5% and 10% probability level respectively.
Source: *Computed own surveydata, (2019)*

Family Size(FAM SIZE).Family size is found to have positive and significant relation to livelihood diversification strategies at less than 1% probability level. The odds-ratio result depicted that, if other factors held constant, the relative amount, an addition of one member to the family the probability of participation on livelihood diversification increase by 1.38 .The positive relation between family size and diversification might be due to the large family size and household labor that an additional member to the household increases the probability of participating in livelihood diversification.The reasons is productive family size adds careful to share of total income received from different activities by engaging in different livelihood activities. Then bigfamilies will venture into as ways as possible to gain the required resources to support their families and usually considered as an indicated of labor availability and households with abundant labour supply and believed more likely to engage in livelihood diversification by participation highly in non-agricultural activities.This is in line with the

findings of Gebru*et al*. (2018) that a greater number offamily members implies free labour and thus leads to increased production.

Education level of household (EDU): It is a basic social service where by human capital could be developed which is a necessary resource for livelihood improvement and poverty reduction the variable had positively and significantly influenced the determinant of household participation on livelihood diversificationat 5% probabilitylevel .So that it was found to be one of the important determinants of livelihood diversification. The odd ratio reveal that, other variables constant a schooling year of household heads by one unit will increase a probability of participating in the livelihood diversification increase by 1.10.Therefore, the finding confirms that an increase a year of schoolinghousehold head will increase the likelihood of households to pursue diversifiedlivelihoods.This is due to most probably educated person gain better skill, experience, knowledge, to get information and determine the capacity of finding jobs and these help them to engage in diversified livelihood strategies.This finding is similar with the previous studies conducted byAdugna and Wagayehu (2012) assumed education as an essential in increasing off/non-farm earnings and time allocation of rural families and to diversify the rural economy away from agriculture. The finding of Yenesew S.*et al* (2015) and Prowse, M.(2015) better educated households are capable of calculating the costs and benefits of income generating activities and hence,enable them to engage in non/off-farm activities.

Credit services (CREDIT): As the model result indicates, the variable access to credit had positively and significantly influenced the likelihood of participating on livelihood diversification at less than 1% significance level. The odds ratio indicated in the model reveal that, other variables constant with regard to credit implies that as the households were receive credit, the probability of involvement in off/nonfarm activities in addition to agriculture will raise by 1.62. From this result it can be stated that those household who have access to formal credit, from credit institution or from relative person are more probable diversified than those who have no access to formal or any relative credit association .In the study area access to credit is determined by availability of cash on hand as indicated in the descriptive part .On the other hand, household thathas no cash on hand will be devoid of the opportunity.This might be true, if households especially those who have limited land size easily access the financial

credit can diversify their income source. This is due to the reason that households who have limited land size can diversify their livelihood if they have easy access to credit service. This result is in line with Anshiso & Shiferaw (2016).According to finding ofSimtowe& Zeller (2006) with an option of borrowing, a household can do away with inefficient risk reducing income diversification strategies and concentrate on more risky but also more efficient investments.

Total land holding (LAND): The land size and livelihood diversification in this study has significant and negative relation at 10% by the expectation land is one of the naturalassets for rural household.The odd ratio reveals that as the land size increases by one unit (hectare), the probability of participation in livelihood activities deceases by 0.86 in the rural household. This is reason may be due to thefarmers with large farm size are less likely to diversify their livelihood into off/non-farm than those household who have small land size householdswith less size.Large farm size helps household to cultivate and produce more, which in turn increases farm income and improves livelihood of a household. On the other hand, declining land sizes under population pressure may encourage rural households to diversify their sources of income. That means, household having more land size rely on crop production rather than go to off/nonfarm in order to satisfy basic needs.The result of this study confirms the earlier findings byDilrubaKhatun and Roy (2012).Similarly, Adugna and Wagayehu(2012) has found that area of land owned by the household has a significant and negative correlation with the likelihood of choosing diversified livelihood.

Livestock ownership(TLU): Livestock is a core and liquid asset for improvement of livelihood. This study indicates that the number of tropical livestock unit affected negatively and significantly the probability of diversifying household into non/off farm activities at 5%probability level. The odds ratio shows that, other things held constant as the number oflivestock units increases by one TLU, in favor participating livelihood diversification decrease by 0.86.This result shows that those household with large number of livestock are less likely to participate in livelihood diversification than those who own small number of TLU.The negative relationship between livelihood diversification and number of TLU indicates that herd size creates better opportunity to earn more income from livestock production and helps household to fulfill family requirement including food. Hence,

households who can get the required amount of food from livestock may not engage in another income generating activities unless their objective is to increase their asset holding. On the other hand, households with less number of livestock try to diversify their income portfolio by participating in off-farm and non-farm activities and this accelerates the rate of diversification.The possible reason could be households who obtained the required amount of cash from livestock may not need to involve in non/off-farm activities for additional income. This is in line with the findings of Yisehak*et al.(*2014) and Yenesew*et al. (*2015).

Off-farmincome(OFFINC): As expected, this variable found to have positive and significant influence on households livelihood diversification at 10% probabilitylevel.From the model result, other things being constant, odd ratio reveals that the probability of a household diversifying into different livelihood activities increased by 0.010 with higher level their income increased in one Ethiopian birr. The positive result implies that households with high amount income are more likely to diversify the livelihood strategies into off-farm and/or non-farm activities.This result shows that those households with low income are less likely to participate in livelihood diversified income activities than those who have high income. Hence, higher income can encourage them to invest in other income generating (especially non-farm) activities. In line with Yisehak*et al.* (2014) found that the total annual off farmincome have positive and significant relationship with livelihood diversification at less than 5% probability level.

4.4 The Impact of Livelihood Diversification on Household Poverty

To examine the effect of livelihood diversification increasing the income of rural householdsprobability the study identified livelihood activities employed by households, determine povertystatus of households Moreover, income share method was used to identify diversified and non diversified households. The descriptive statistics for diversified and non diversified households shows that the two groups had a significant mean difference with respect, asset holdings of households. That means, a binary logit model is used to examine the effect of participation in different livelihood activities on rural poverty identify and examine the impact of rural household poverty the proportion of the population whose standard of living is greater than the poverty line to the number of individuals or households.

4.4.1Livelihood diversification and household poverty nexus in the study area

The survey result revealed that among 385 total sample households the average of participating in different livelihood activities were 61.04% and the remaining 38.96% were not participating in any of income earning activities. In addition, from the total sample households, 62.86 % sample households are found to be non-poor (lie above poverty line) while 37.14% them are found to be poor (lie below the poverty line). The chi squareresult on the (Table 14) indicate that (2.7840 Pr = 0.095).This result show that thedifference between livelihood diversification and poverty status significant at 10% probability level. This implies that most of the rural household in the study area diversify their livelihood source and this may influence their level fairly strong linkage between poverty. The implication is that, rural livelihood diversification plays a vital importance in reducing poverty and increasing the income of rural households.

Table 14. Livelihood strategies by poverty status

	Livelihood diversification			
Poverty status	**Diversified (N=235)**	**Non diversified (N=150)**	**Total (N=385)**	
	%	**%**	**%**	**$\chi 2$**
Non poor (242)	39.48	23.38	62.86	
Poor (143)	21.56	15.58	37.14	
Total	61.04	38.96	100	2.784*

*represent significant at 10% probability level ***Sources****; own survey data (2019)*

4.4.2. Matching group and non-group households

There are four main tasks that must be carried out before conducting the matching work itself.First, estimating the predicted values of program participation (propensity score) for all the sample households of both program and control groups (which was done in the previous section) is a primary activity. Second, imposing a common support condition on the propensity score distributions of household with and without the program is another important task. Third, discarding observations whose predicted propensity scores fall outside the range

of the common support region is the next work.(whether the hidden bias affects the estimated average treatment on treated or not) is the final task.

The estimated propensity scores vary between 0.150 and 0. 978 (mean= 0.68) for diversified households and between 0.099 and 0.908 (mean = 0.496) for non diversified(control) households. The common support region would therefore, lie between 0.150 and 0.908 which means households whose estimated propensity scores are less than 0.150 and larger than 0.908 are not considered for the matching purpose. As a result of this restriction,28households were discarded.(Table,15)

Table 15. Distribution of estimated propensity scores

Group	Observation	Mean	SD	Minimum	Maximum
Total Households	385	0.61	0.21	0.099	0.978
Diversified HHs	235	0.68	0.19	0.150	0.978
Non diversify HHs	150	0.496	0.193	0.099	0.908

Source: *computed own survey data (2019)*

4.4.3. Choice of matching algorithm

Different alternatives of matching estimators were conducted to match the treatment and control households fall in the common support region. The decision on the final choice of an appropriate matching estimator was based on three different criteria as suggested by Dehejia and Wahba (2002). First, equal mean test (referred to as the balancing test) which suggests that a matching estimator which balances all explanatory variables (i.e results in insignificant mean differences between the two groups) after matching is preferred. Second, looking into pseudo-R^2 value, the smallest or lowest value is preferable. Third, a matching estimator that results in the largest number of matched sample size is preferred.

To sum up, a matching estimator that balances all explanatory variables, with lowest pseudo-R^2 value and produces a large matched sample size is preferable presents the estimated results of tests of matching quality based on the three performance criteria. Looking into the result of the matching quality, nearest neighbor matching (NN) of neighborhood 2 was found to be the best for the data we have at hand. Hence, the estimation of the results and discussion for this

study are the direct outcomes of the NN matching algorithm with a neighbor 2(Appendixtable 8)

4.4.4. Testing the balance of propensity score and covariates

Once the best performing matching algorithm is chosen, the next task is to check the balancing of propensity score and covariate using different procedures by applying the selected matching algorithm (NN 2 matching in our result). It should be clear that the main intention of estimating propensity score is not to get a precise prediction of selection into treatment. Rather, to balance the distributions of relevant variables in both groups.

4.4.5 Propensity score and covariate balances test

The balancing powers of the estimations are ensured by different testing methods. Reduction in the mean standardized bias between the matched and unmatched households, equality of means using t-test and chi-square test for joint significance of the variables used are employed here. The 5^{th} and 6^{th}columns of(Appendix table 9)shows that the standardized bias before and after matching, and the total bias reduction obtained by the matching procedure, respectively. The standardized difference in covariates before matching is in the range of 3.7% and 65.2% in absolute value whereas the remaining standardized difference of covariates for almost all covariates lies between 1.1% and 13% after matching. This is fairly below the critical level of 20% suggested by Rosenbaum and Rubin (1985). Therefore, the process of matching creates a high degree of covariate balance between the treatment and control samples that are ready to use in the estimation procedure.

As indicated in (Table 16), the values of pseudo-R^2 are very low (0.007). This low pseudo-R^2 value and the insignificant likelihood ratio tests (P >$chi^2$0.993)support the hypothesis that both groups have the same distribution in the covariates after matching. These results indicate that the matching procedure is able to balance the characteristics in the treated and the matched comparison groups. Hence, these results can be used to assess the impact of diversification among groups of households having similar observed characteristics. This enables us to compare observed outcomes for treatments with those of a control groups sharing a common support.

Table 16.Chi-square test for the joint significance of variables

Sample	Ps R^2	LR chi^2	P >chi^2
Unmatched	0.154	79.49	0.000
Matched	0.007	3.83	0.993

Source: *computed own survey data (2019)*

The Common Support Condition: Figure 4 below gives the histogram of the estimated propensity scores for diversified and non diversified. A visual inspection of the density distributions of the estimated propensity scores for the two groups indicates that the common support condition is satisfied: there is substantial overlap in the distribution of the propensity scores of both groups. The bottom half of the graph shows the propensity scores distribution for the non-d diversified/untreated and the upper half refers to the diversified/treated on support .The densities of the scores are on the y-axis.

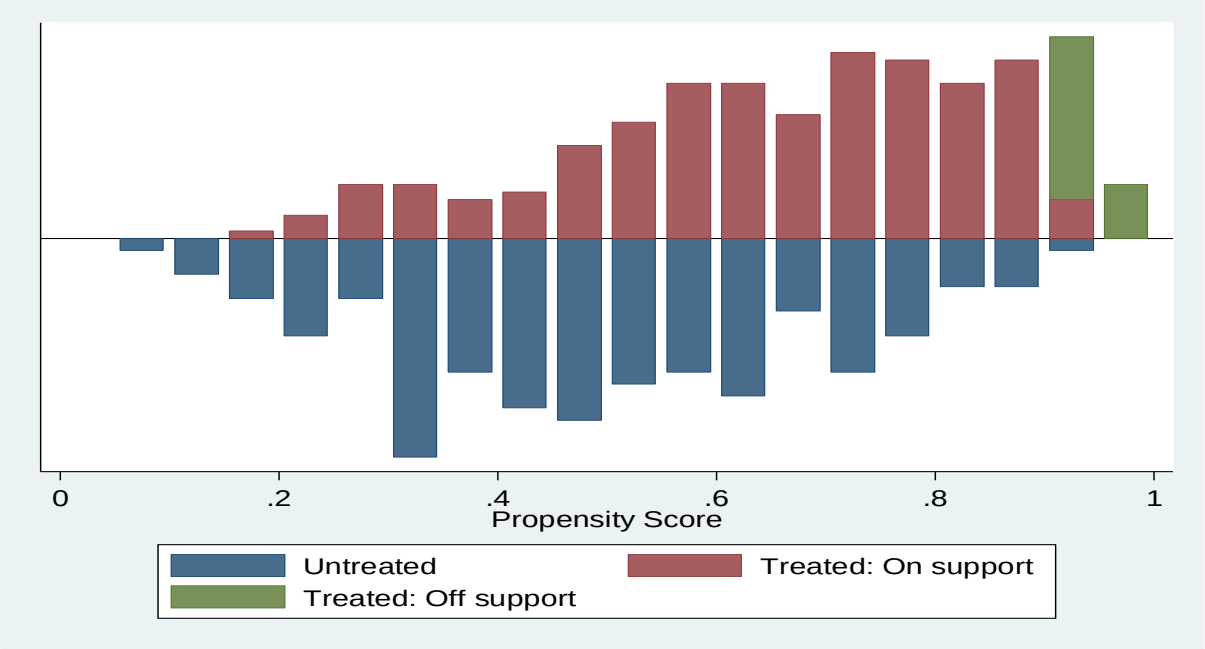

Figure 6: Propensity score matching graph ***Source:*** *own survey data, (2019)*

All of the above tests suggest that the matching algorithm we have chosen is relatively the best for the data at hand. Therefore, we can proceed to estimate the average treatment effect on the treated (ATT) for the sample households.

4.4.6. Treatment effect on the treated

In order to attain the stated objectives the study, this section evaluates the impact of the diversification on the outcome variable for their significant impact on participant household, after the pre-intervention differences were controlled. The estimation result presented in (Table17)provides a supportive evidence of significant effect of livelihood diversification on outcome variable. A positive value ofaverage treatment effecton the treated (ATT) (the difference between the treated and the control)dueto the participating the household livelihood diversification decreasing the poverty status.

Table 17.Average treatment effect on the treated (ATT) estimation results

Variable	Sample	Treated	Controls	Difference	S.E.	t- test
Change in Poverty status in Birr	Unmatched	2911.59	2593.63	317.96	75.419	4.22
	ATT	2913.35	2651.36	261.99	120.99	2.17**

** represent significant at 5% probability level***Source:*** *Computed ownsurvey data, (2019)*

The study provides evidence as whether or not the participation in livelihood diversification has brought significant changes on household's poverty status. The estimation result provides a supportive evidence of significant and positive effect of the program on household poverty status in birr.Participation in livelihood diversification has increased the income of the households in birr for participant households on average by 9%.This findingin line with (Yousuf and Zeleke, 2013) who found the positive impacts of livelihood diversification on the households' food security and (Gebreyesus, 2016)who found the positive impact of livelihood diversification on household income.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Livelihood diversification strategies have the potential to help rural households reduce poverty by offering them with a form of insurance against the threats of household and minimizing reliance on natural resources. In fact there are contexts where livelihood diversification strategies can have economic scope effect when rural households invest resources across multiple scopes and obtain higher per unit returns.Farm household also need to diversify due to their inability to specialize and to get sufficient income, the maintenance and continuous alteration of highly varied range of activities and occupations to minimize household income variability, reduce the adverse impacts of seasonality, and provide employment or additional income.

Based on the information were gathered selected woreda of Jimma zone livelihood diversicatoin adopted by the poor are not clearly assessed in relation to poverty reduction efforts .The aim of this study to investigate the impact of rural livelihood diversification on household poverty. The research focus on the study were descried of information related to rural livelihood diversification by collecting cross sectional data from two woredas namely (Gera and Mana) of Jimma zone, Oromia National Regional State of South West Ethiopia .

Multi-stage sampling tehiquence were used first Mana and Gera woreda purposively selected based on the high rate of local pepoel partitcipating of livelihood diversification activities. Secondly, four kebeles were selected through random sampling methods. Finally, simple random sampling techniques were used to identify 385 sample households. Probability proportion size (PPS) were used to redistribute sample respondents across kebeles.Cochran's formula was employed in determining sample size.Pilot informal survey taste on non-sample respondents were conducted by the supervision of the researcher and necessary modification was made on the basis of the results obtained and Primary data were collected from sample household by using structural questionnaire survey, key informant interview, focus group discussion (FDG) and personal observation used to cross checking asset bases, major vulnerability contexts, policy and institutional frameworks, livelihood strategies and

livelihood out comes the respondent. Secondary data were obtained from various relevant sources.

According to descriptive analysis, some variations were observed between poverty status and explanatory variable t-test and chi-square tests indicated the existence of significant the mean difference between exploratory variable and poverty status of sample household.Additionally, the existences of significant mean different between different explartory variablesand livelihood diversified and non-diversified of sample household. different explartory variables.

Multicollinearity existence was tested for the selected variables before regress binarylogit regression model. Accordingly, 12 variables were tested variance inflation factors (VIF) and contingency coefficients (C) were also calculated to identify the degree of correlation among the independent continuous and discrete variables, respectively.

Econometric modelwere used to analysis the binary logit model to analyzing the determinants of livelihood diversification. From12 explanatory independent variables included in themodel six of them are found to be significantly influencing the determinant of livelihood diversification positively and negatively. Additionally, to identified the impact of livelihood diversification on rural household poverty thepropensity score matching (PSM) further based on the criteria of selecting matching algorithm the ATT iscalculated. The impact estimation result shows that participation of livelihood diversification has positive impact on household poverty in the study area.

5.2Conclusions

Livelihood diversification into off/ non-farm activities plays a significant role in the context of inadequate and low income households. Households who diversified their livelihood activities are the ones who able to build better asset less vulnerable and reduced poverty than the undiversified ones.

The study used cost of basic needs approach computed the poverty line of the household study area by using consumption as an indicator FGT poverty line measure of welfare or standard of living. Based on the information on welfare indicator of adult equivalent consumption we

computed poverty line, which is the combination of food and non food poverty expenditure, Birr2887.1.Concedering the amount of benchmark thepoverty line result shows that242(62.86%) of the sample households were non poor(able to fulfill the basic requerment) and 143 (37.14%)were poor (under requirement)sample household.

The primary objective of the study is to assess the status livelihood strategies by rural household based of the result obtained from the sample household the majority 235(61.04%) were able to diversity into different livelihood activities. Whereas 150(38.96%) sample households were unable to diversify their livelihoods, often lacking the means to engage in any form of income-generating activities.

The descriptive result indicate that the mean deference between age of sample household ,sex of sample household, family size, educational level farm size, livestock owners market distance, frequency ofextension contact, total off/ nonfarm income and dependency ratio and poverty status statically significantat 1%,5%and 10% probability level.On the other hand the descriptive result indicate that the mean difference between, age of sample household, family size,educational level ,land size,offand nonfarm income livestock owenership and and sex of sample household and livelihood diversfication statically significantat 1%,5% and 10% probability level.

The economic important factors that the determinant of livelihood diversification influence include family size, educational level, credit services and off farm income sample household positively and significant at 1%,5% and 10% probability level.The remaining exploratory variables total livestock ownership and total land size negative affecting the determinant of household livelihood diversification significant at 5%and 10% probability level.

Based on the empirical evidence from the findings of this study, it could be concludedthat family size has positive and significant influences the determinant livelihood diversification large family size is indicated of labor availability and household with abundant labor supply and believed more likely to engage in livelihood diversification by participation highly in non-agricultural activities.Educational level of household heads influences livelihood diversification positively ; this implies that educated households apply their knowledge and

skill gained from various sources to determine the capacity of finding job and help them to engage in diversified livelihood strategies.

The study result show that credit service has positive and significant influencesthe determinants livelihood diversification this implies the household especially those who have limited land size easily access to financial credit services and can diversified their income source and participating different income generating activities. The result further found out that off farm income positive and significant influence the determinant livelihood diversification. This indicated household with high amount of income is more likely to diversify the livelihood strategies in to off/nonfarm activities.

The study indicate both land holding and livestock ownership has negative and significant the determinant of household livelihood diversification these indicated households with large livestock ownership that herd size created better opportunity to earn more income from livestock production and helps to fulfill family requirement including food .On the other hand large farm size rely on crop production rather than off/nonfarm in order to satisfy basic needs. Whereas declined land sizes under population pressure may encourage rural household to diversify their sources of income.

The impact estimate result shows that participant of the livelihood had positive impact on household poverty in the study area. By controlling other variablesthe estimation result provides a supportive evidence of significant and positive effect of the program on household poverty status. Participation in livelihood diversification has increased the income of the households for participant households on average by 9%from what they would have in the absence of the program (non diversified)

5.3Recommendations

Livelihood diversification has played important impact of poverty reducing on rural household by improving the income of poor household in the study area based on the finding recommendation as followed:

Family size had significant and positive influencethe determinant of livelihood diversification the labor availability and households with abundant labour supply and believed more likely to engage in livelihood diversification by participation highly in non-agricultural activities.This guarantees having greater task-force for participating in diversified income generating activities and financial performance for household.

The result also concluded that years of education influence determinant of livelihood diversification positively there for educated households apply their knowledge and skill gained information from various sources and determine the capacity of finding jobs and these help them to engage in diversified livelihood strategies.Therefore, investing and give attention to increasing access of formal education will help the rural households in getting alternative income as it increases the probability engagement in rural non-farm activities and livelihood diversification.

The study also revealed that diversified among household required an external financial sources through credit .Rural household who have access to credit tends to be more diversified than those who do not have access to credit .Therefore barriers on the supply sides of (high interest rate ,down payment) household more diversified and should be reducing overcoming poverty. Access to credit constraint and lack of entrepreneurship skills may have to be addressed via provision of enough credit with lowest interest rate and entrepreneurship skills training before household engage to nonfarm activities.

The finding off farm income is positively siginficant influences the determinant oflivelihood diversification. Therefore households with high amount income are more likely to diversify the livelihood strategies into off-farm and/or non-farm activities. Hence, higher income can encourage them to invest in other income-generating especially non-farm activities.The strong significant association of off farm income on diversification policy measures in order to pave the way to solve financial problems through developing and strengthening financial institution, creating credit access and promoting better income generating options activities.

Livestock ownership is negatively influence the determinant of livelihood diversification. Therefore,households with large livestock owner that herd size creates better opportunity to earn more income from livestock production and helps to fulfill family requirement including

food.Suggests that designingdevelopment strategy for livestock sector through improving livestock breeds, veterinary services, grazing land marketing and overall management of livestock production.

Additionally, land size is negatively influences the determinant of livelihood diversification. More land size rely on crop production rather than off/nonfarm in order to satisfy basic needs. Suggests that concerned bodies to develop appropriate strategies andpolicies especially for land resource-poor household. The presence of very small size of land also calls for giving emphasis in agricultural intensification to enhance the productivity of the land so that generate adequate income and food.

The positive relationship between livelihood diversification and poverty observed indicated that when participating livelihood diversification increased poverty decreased ,hence then, creation of job and business opportunities that can generate off/nonfarm income for the household. Poverty reducation strategies should target specific location and specific households as most of the time poverty by its nature is individual centers rather than aggregated. Therefore schemes that can improved income of individual households in localities should be employed selectively.

Generally government and policy makers should be recognize and support off/nonfarm livelihood diversification strategies as part of the study area job creation objectives instead of increasing rural income and reducing rural poverty strongly relies upon the development of off/nonfarm activities, Therefore, in an economy where there is rapid population growth associated with declining agriculture land to population ratio ,rural poverty reduction strategies should aim at the economic transformation of rural area via the establishment of micro and small scale enterprise off/non activities as they can reduce unemployment specially the youth and rural poor.

Areas of further research

In light of the findings of the study, there is need for further research in the following areas
The study sought to understand how the diversification of livelihoods has impacted on household poverty .The diminishnal returns in household agriculture due to a multiplicity of factors such as, climate change, environmental degradation, population growth, globalisation and weak support from national government, off/nonfarm livelihoods have the potential to contribute significantly to food security, poverty reduction and household incomes.

- The difficult linkages between rural off/nonfarm livelihoods and agriculture imply that with the good rural infrastructure it may significantly support and growth of rural household. The study will focus on how households participating and utilized.

- Problems with access to capital and credit, marketing information and facilities, skills culture and business networks continue to act as barriers to entry for poorer households how poor households have been access to ues it. Sepically the women's

- Although, substantial resources have been spent on agricultural research and extension to alleviate poverty in the nation, research and extension activities have not been done adequately on the issues related to off or non- farm employment.

- Household are engaged in a variety of off and/or non-farm activities to diversify their income with a view to feed and sustain themselves during crop failures and how to mitigate from the risk.

- The recent scaling up of support to farmers household though distribution of seeds with the terminator gene poses numerous questions household produced both agricultural and non agricultural activties on the sustainability of poverty reducing and food security interventions.

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7. APPENDIX

Appendix Table 1. Conversion Factors used to Estimate Adult Equivalent

Age group	**Male**	**Female**
< 10 years	0.6	0.6
10-14 years	0.8	0.9
15-34 years	1	0.75
35-65 years	1	0.75
> 65 years	1	0.75

Source: Storck, et al. (1991)

Appendix Table 2. Conversation factor to compute tropical livestock unit (TLU)

Animal categories	TLU
Calf	0.25
Waned calf	0.34
Heifer	0.75
Cow /ox	1.00
Hours	1.00
Donkey /adult	0.70
Donkey /young	0.35
Sheep and got (adult)	0.13
Sheep and got(young)	0.06
Chicken	0.013

***Source**;storck,et al (1991)*

Appendix Table 3. Food poverty line and Kcal.share of the food items

Food items	Mean kcal per Kg/lt	Gm/AE Per day	Kcal/day Per AE	Kcal share (%)	Mean/price Per kg/lt (birr)	Value of poverty Line/year (birr)	Expenditure share (%)
Maize	3770	78.56	551.27	23.92	4.68	605.85	42.81
Sorghum	3805	67.45	427.97	24.05	2,78	455.25	27.43
Teff	3589	55,06	370.13	13.08	10.63	328.72	4.46
Bean/pea	3514	12.15	346.47	17.71	5.45	343.41	2.89
Vegetable	1230	8.02	36.05	7.56	4.35	79.35	1.90
Milk	850	61.67	53.42	2.38	2.09	128.65	8.37
Meat	1970	9.00	221.73	0.81	3.32	58.12	1.89
Edible oil	8964	32.92	33.38	3.01	15.50	56.74	3.73
Enset /tubers	4330	15,09	76.65	6.26	8.26	34.54	0.70
Coffee and tea	1103	25.30	36.46	1.38	1.88	8.18	1.20
Sugar	3850	8.13	13.48	0.18	5.50	29.88	1.37
Salt	1780	13.18	28.78	0.82	1.21	13.50	2.23
kaht	-	5.24	4.21	0.56	2.43	5.09	1.02
Total			**2200**	**100**		**2147.28**	**100**

Sources;The mean kcal per kg/lt was extracted from EHNRI (2008) Food Composition table the other is computed from survey data (2019)

Appendix Table 4. The mean value cost of non-food expenditure sample household

Non food expenditure	**Mean value of expenditure (birr)EA/year**
Clothing	57.18
Medical/ healthcare	33.16
School fee	48 .02
Social obligations (weeding)	26.00
Tax and Public Contributions	27.28
Transport cost	29.43
Total	**221.07**

Sources; *computation own survey data (2019)*

Appendix Table 5. Multicollinearity test for continuous variables

Variables	Variables cod	VIF	1/VIF/ R2
Age	AGEHHD	1.03	0.969620
Family size	FAM SIZE	1.04	0.956981
Dependency ratio	DEPENDACY	1.03	0.968434
Land size	LANDSIZE	1.24	0.808673
HH education	EDU	1.03	0.975376
Livestock ownership	TLU	1.21	0.823497
Market distance	DISMKT	1.07	0.936023
Off farm income	OFF INCO	1.10	0.907454
Nonfarm income	NONINCO	1.03	0.967354
Mean VIF		**1.09**	

***Source** ; computed own survey data(2019)*

Appendix Table 6. Contingency coefficient for discrete variables

Contingency Coefficient		
Variables	**SEXHHD**	**CREDIT**
SEXHHD	1.0000	
CREDIT	0.0640	1.0000

***Source**: computed survey data, (2019)*

Appendix Table 7. Robust and check of binary logitregress before impact estimator

Robust				
Variables	**Coefficient**	**Std. Err**	**z**	**P>z**
Sex	.2398855	.244918	0.98	0.327
Age	.0022859	.0090128	0.25	0.800
Family size	.3254973	.0617953	5.27***	0.000
Dependency ration	-.0991398	.1533176	-0.65	0.518
Education	.097415	.0464259	2.10**	0.036
credit	.9661014	.255318	3.78***	0.000
Land size	-.1440323	.0827905	-1.74*	0.082
Extension contact	.1218438	.1048981	1.16	0.245
Market distance	.0012969	.0031306	0.41	0.679
Livestock ownership	-.1426449	.0672762	-2.12**	0.034
Off farm income	.000307	.0001652	1.86*	0.063
Nonfarm income	.0000661	.0000456	1.45	0.147
_cons	-2.48189	.8581793	-2.89	0.004

Number of obs = 385 Wald chi2(12) = 63.20
Pseudo R2 = 0.1528
Prob> chi2 = 0.0000
Log pseudo likelihood =-218.07066

***, **and * represents significant at the 1%, 5% and 10% probability levels, respectively

***Sources** : computed owe survey data(2019)*

Appendix Table 8. Matching performance of different estimators

	Performance criteria		
Matching Algorisms	**Balancing test***	**Pseudo-R^2 after matching**	**Matched sample size**
	Nearest Neighbor (NN)		
Neighbor(1)	12	0.015	357
Neighbor(2)	**12**	**0.007**	**357**
Neighbor(3)	11	0.011	357
Neighbor(4)	12	0.010	357
Neighbor(5)	12	0.013	357
	Caliper Matching(CM)		
0.01	12	0.014	356
0.1	12	0.015	357
0.25	12	0.015	357
0.5	12	0.015	357
	Kernel Matching (KM)		
With band width of (0.01)	12	0.012	356
With band width of (0.1)	12	0.009	357
With band width of (0.25)	12	0.017	357
With band width of (0.5)	10	0.052	357
	Radius Matching(RM)		
With band width of (0.01)	8	0.108	357
With band width of (0.1)	8	0.108	357
With band width of (0.25)	8	0.108	357
With band width of (0.5)	8	0.108	357

***Source**; computed own survey data(2019)*

Appendix Table 9. Propensity score and covariate balances test

Variables	Sample	Mean		Standard bias %	Reduction bias %	t-test	P- value
		Treated	Control				
_ p score	Unmatched	.68335	.49608	97.4	99.9	9.34	0.000
	Matched	.64925	.649	0.1		0.01	0.989
Sex	Unmatched	1.3745	1.3267	10.0	49.5	0.95	0.341
	Matched	1.372	1.3478	5.1		0.51	0.610
Age	Unmatched	43.251	42.78	3.7	69.7	0.35	0.724
	Matched	42.976	43.118	-1.1		-0.12	0.903
Family size	Unmatched	5.6183	4.28	65.2	91.8	6.04***	0.000
	Matched	5.1874	5.2971	-5.3		0.56	0.576
Dependency ratio	Unmatched	.83064	.9448	-16.2	68.0	-1.55	0.122
	Matched	.82355	.78704	5.2		0.60	0.550
Education	Unmatched	3.5106	2.8533	26.2	90.1	2.46**	0.014
	Matched	3.4058	3.471	-2.6		-0.25	0.799
Access to credit	Unmatched	1.634	1.48	31.3	74.9	3.01***	0.003
	Matched	1.6039	1.6425	-7.9		-0.81	0.418
Land size	Unmatched	1.7802	2.3511	-36.8	79.1	-3.62***	0.000
	Matched	1.7916	1.9109	-7.7		-0.86	0.389
Extension contact	Unmatched	2.4383	2.6067	-14.2	46.9	-1.35	0.176
	Matched	2.5072	2.5966	-7.5		-0.79	0.432
Market distance	Unmatched	90.051	93.373	-8.8	67.4	-0.84	0.403
	Matched	90.179	91.261	-2.9		-0.29	0.770
Livestock holding	Unmatched	2.2672	2.9374	-34.2	62.1	-3.37***	0.001
	Matched	2.4123	2.6663	-13.0		-1.44	0.150
Off farm income	Unmatched	560.97	382.65	22.3	93.4	2.07**	0.039
	Matched	534.91	523.07	1.5		0.14	0.890
Nonfarm income	Unmatched	2368.7	1875	14.6	70.0	1.30	0.195
	Matched	2005.2	1857.2	4.4		0.78	0.436

***, **and * represents significant at the 1%, 5% and 10% probability levels, respectively.

***Sources**: computed own survey data (2019)*

IISurvey Questionnaire

Questionnaire on Impact of Rural household Livelihood Diversification on Household Poverty in Jimma zone

Sir/No of the questionnaire……

Introduction

My name is ..... I am datacollector for the research. This Research is done by TsehayneshAbebe as apartial fulfillment for her MSc. Degree in Rural Development and AgriculturalExtension at Jimma University. The information you give will only be used for academic purpose and remain confidential. Hence, your Kind and Precise response is very helpful to achieve the objectives of this study.

Identification Particulars

1. Woreda/District ……. 1.Gera 2.Mana
2. Kebele ……
3. Enumerator's name ….……
4. Date of Interview ……
5. Signature of enumerators ……

1. Demographic and socio economic characteristicsidentification of the household in the study area

1.1Household Information

1: Name of household head ……..
2: Sex of household head 1. Male 2. Female
3: Age of household head…….....years
4: Total family size you have? Male……..Female…….Total…….
5: Number of children under ages old 0 -14 ……
6. Number of family members between ages of 14-64 …….
7: Number family members older than ages >65 year……
8: Marital status HHD 1 .Single 2.Married
9: Ethnics of HHD 1. Oromo 2.Ahmara3. Yam 4.Guragea 5.Siltte 6.Others
10: Religions 1.Orthodox 2 . Protestant, 3.Muslim, 4 . Catholic 5.Waqeefataa6..Others…

I. LIVELIHOOD VULNERABILITY CONTEXT

Have you exposed to the following shocks in the last the last two years.

Code					
11		Death of family member	1.Yes 2.No	If yes, how many the numbers	1.One 2.Two 3.three
12		Death of livestock	1. yes 2.No	If yes, how many	1.One 2.Two 3.three
13		Severe drought	1. Yes 2, No	If yes, level of damage	1.Little 2.High 3.V/high
14		Flooding	1. Yes 2. No	If yes, level of damage	1. Low 2.Medium 3.High
15		Conflict / disputes	1. Yes 2. No	If yes, the reason	1.Grazing land 2.politics
16		House/ property burn	1. Yes 2.No	If yes, level of damage	1.Little 2. High 3.V/high
17		Price fall of cash crops/ coffee	1. Yes 2. No	If yes , of reason falling	1.qulity 2.surplus
18		Heavy rain that damage crops / snows	1. Yes 2. No	If yes, level of damage	1.Little 2.Medium 3.High
19		Plant Pest and disease infestation (locust, CBD,CSD	1. Yes 2.No	If yes level of infested	1.Low 2.Medium 3.High
20		Livestock pest and disease	1.yes 2. No	If yes level of damage	1.Low 2.Medium 3.High
21		The destruction of road and difficult to loading product	1. yes 2.No	If yes the damage	1. Some part 2. Half part 3.All part
22		What are the other challenge your faced a go life ?			

II LIVELIHOOD ASSETS

A. Human capital

23	Highest education of household head in years?	
24	Highest education of spouse in years?	
25	Have you faced serious health problems in the last two years in the area ?	1.yes 2.No
26	Have any member of your family faced serious health problem in the last two year ?	1.yes 2.No
27	Have you attended any kind of training in the last two years ?	1.yes 2.No
28	What is others skilled do you have? ----------, ----------, ----------	

B. Physical capital

29	Do you get school service for your family?	1. Yes 2.No
30	How far is the nearest school to you ?…….mints	
31	Do all school aged children attend schooling ?	1. yes 2.No
32	If no , what are the reasons for children's absent from schooling 1. Labor shortage 2.not interested 3.financial shortage 4. Others important job	
33	Do you have human health facilities in your community?	1. yes 2.No
34	If yes, where is the nearest health facility in your local community? 1. Within the kebele 2. Within District/ woreda	
35	What kinds of health facilities are available in your community? 1. Hospital 2.Health center 2.Clinic 3. Health extension 4. there is no	
36	How much the distance far from you home to go the health services?	
37	Do you have access to potable water?	1. yes 2. No
38	How far you travel to fetch water? ……. minuets	
39	Do you have portable road for transportation?	1.yes 2..No
40	Distance from residence to all weather road ……..	
41	Do you have your own house?	1. yes 2.No
42	If yes, what type of house? …… (Multiple answer possible) 1. Grass roofed 2. Plastic roofed house 3. Iron sheet roofed house 5.Others (specify)	1. yes 2.No
43	Do you or a member of your household own radio?	1. yes 2.No
44	Do you or a member of your household own Television?	1. yes 2.No
45	Do you or a member of your household own mobile / telephone?	1. yes 2.No
46	Do you or a member of your household own bicycle or motor bicycle?	1. yes 2.No
53	Do you or a member of your household own donkey or horse cart?	1. yes 2.No
54	Do you or a member of your household own Bajaj?	1. yes 2.No
55	Do you or a member of your household own motor grind mill? (motor weaficho)	1. yes 2.No

C. Social capital participate household head

56	Have you participated in different social activities in the last two years mentioned below?	1. Yes 2. No
57	Share cropping	1. Yes 2. No
58	Cooperatives	1. Yes 2. No
59	Iquib	1. Yes 2. No
60	Eddir	1. Yes 2. No
61	Dabbo/ Daddo	1. Yes 2. No
62	Do you get relevant agricultural information on time ?	1. Yes 2. No

D. Financial capital household head

63	Have you received any type of credit in last two year?	1. yes 2. No
64	If yes how much? ……..	
65	If no why? (Multiple answers are possible) 1. Fear of ability to pay 2. No asset for collateral 3. High interest rate 4. Price fluctuation in the market 5. Worrying high tax 6. Others specify……..	
66	If yes, from whom do you borrow credit? 1. Relatives family 2. Oromia micro-credit associations 3. Private lenders 4.banks (specify)…….	
67	Do you have saving habit? …….	1. yes 2. No
68	If yes, how much saved in cash and kind the last two year ?……	

E . Natural capital of household ownership

69	Do you have own land?	1.yes 2. No
70	If yes, how money? …….	
71	Total crop land-holding size in hectare (ha) …….	
72	Do you have grazing land ?	1.yes 2. No
73	If yes, how much grazing land do you own in hectares?	
74	Do you have own forest land ?(Eucalyptus tree)	1.yes 2. No
75	How much forest land do you have in hectares?	
76	Do you have irrigation land?	1.yes 2. No
77	How much irrigation land do you have in hectares? ……..	

III POLICES AND INSTITUTIONS (Access to institutional services**)**

78	Is there development agent in your PAs?	1. Yes 2. No
79	Has your household received any type of extension services from any government / NGOs?	1. Yes 2. No
80	Has development agent visited your during the last 12 moth year?	1 .Yes 2. No
81	If yes, for how long the frequencies visit you in the last 12 months? 1. Weekly 2. Monthly 3. Quarterly 4.every working days	
82	Has health extension visited you the last two years?	1 .Yes 2. No
83	Do you get food aid in the last two years?	1. yes 2. No
84	If yes what type of food items? 1. Edible oil 2.Wheat 3. Cash 4. Others	
85	If yes, form where to get food aid ?1.NGOs 2.From government 3. Gift from parents	
86	How many days in a month do you not working agricultural activities due to religious holidays? **.....**	
87	Are you a member of any political party including EPRDF?	1. yes 2. No

Market related variables/ Local market process

88	Is there local market near to PA?	1 .Yes 2. No
89	If No, where do you sell your different farm products? 1. Only for consumption 2. Local collectors 3. In the local market 4.wholesalers/brokers 5.Cooperatives/ unions 6. Exchange with goods 7.others (specify)	
90	If Yes, How far the market from your resident? …….	
91	What means of transpiration do you use to transport your product? 1. Trucks 2. Animal power 3. Human power 4. Others means of specify	
92	Do you have market information?	1 .Yes 2. No
93	If yes, from whom do you get market information 1.other farmers 2. radio/media 3. woreda trade office 4. traders 5. ECX 6. Brokers	

IV. LIVELIHOOD STRATEGIES AND ACTIVITIES

A. Agricultures

94	Have you farmed for the last 12 months?	1 .Yes 2. No
95	If the answer is No, why …….	
96	Do you think that your piece of land is enough to support your family?	1 .Yes 2. No

For those crops in the 12 month type and the amount in the household produced

		Type of crop													
	Amount of used	Maize	Soybean	Sorghum	Teff	Haricot bean	Wheat	Vegetables	Tubers	Fruits	Coffee	Chat	Honey	Others	Total income
97	Crop Land /ha														
108	Yield /qt /ha														
121	Consumption/qt														
134	Sell/qt														
147	Income /birr														

B Livestock ownership in the last 12 months

148	Do you own domestic animals?									1 .Yes 2. No		
149	If yes, which classes of livestock do you own? Mentioned below:											
Type of livestock												
150		Cow	Oxen	Shoots	Poultry	Donkey	Horse	Mule	Heifers	Calf	Bee hives	Total Income
160	Numbers											
170	Consumption											
180	Number sold											
190	Income /birr											

C . Non and off farm activities pursuit household in the last one years

191	Do you have income generating from off /non –farm activities mentioned below? If yes from which activities ?	1 .Yes 2. No	Income month	Income in the last 12 months
192	Petty trade(Sale of local drinks, vegetables, coffee ,grain, fruits)	1 .Yes 2. No		
193	Remittance (received money from gift or on hand)	1 .Yes 2. No		
194	Handcraft (pottery, metal works,)	1 .Yes 2. No		
195	Weaving	1 .Yes 2. No		
196	Casual labor wage	1 .Yes 2. No		
197	Fire wood and grass selling	1 .Yes 2. No		
198	Charcoal selling	1 .Yes 2. No		
199	Government allowance /salary	1 .Yes 2. No		
200	Others specify …….			

V LIVELIHOOD OUTCOMEOF HOUSEHOLD

201	How do evaluate the trend of crop production in the area increasing or decreasing ?1.Increasing 2.decreasing 3. Constant
202	How do evaluate your livestock production? 1. Increasing 2.Decreasing 3.Constant
203	How do evaluate your income from off farm business alone the time horizon? 1.Increasing 2.decreasing 3. Constant
204	How do evaluate your income from nonfarm business alone the time horizon? 1.Increasing 2.decreasing 3. Constant
205	In your own view, are the sustainability and productivity of natural resources such as forest, soil and water rising or declining? 1. Increasing 2.Decreasing 3. Constant
206	Is your food security increasing or decreasing? 1. Increasing 2.Decreasing 3. Constant
207	Is your vulnerability to shocks increasing or decreasing? 1. Increasing 2.Decreasing 3. constant
208	Is your adaptabilitycapacity or resistance to shocks increasing or decreasing? 1. Increasing 2.Decreasing 3. Constant

VI EXPENDITURE PATTERN OF HOUSEHOLD LIVELIHOODS

Indicate the amount of expenditures for your family on various food and non-food items in the last 12 month?

Expenditures items							**Remark**
209- 221 **Food items**	**Unity/ kg**	**Annual expenditure birr**	**Non food items**	**Unity/birr**	**Annual expenditure in birr**	**Total Annual expenditure in birr**	
Maize	kg		Clothing	Birr			
Teff	,,		Medical/ healthcare	,,			
Sorghum	,,		School fee	,,			
Soybean	,,		Chat and tobacco	,,			
Millet	,,		Religious contributions	,,			
Milk	Litter		Kerosene (lamp fuel)	,,			
Meat	kg		Veterinary services	,,			
Butter	,,		Social obligations (weeding)	,,			
Sugar	,,		Tax and Public Contributions	,,			
Salt	,,		Transport cost	,,			
Oil	Litter						
Tea leaf	packet						
Others							
Total							
	Did your income fairly cover the above expenses? 1. Yes 2.N o						

What type of food item your family consumed and the local prices in the area?

Household cons ume food items last week days?	Local/prices standardized unit	Quantity	Sources of food item				Remark
			produced	Purchased	Gifts	Food aid	
Maize							
Sorghum							
Teff							
Bean/pea							
Enset (kocho)							
Edible oil							
Potato							
Sweet potato							
Onion							
Tomato							
Salt ,sugar							
Coffee , chat							
Other , specify							

III .Check list for focus group discussion (FGD)

1. What area the vulnerability context affected household livelihood bases in this area?

(shocks , trend and seasonality)

2. What are thedominantlivelihood asset based in this areas?

a) Human resources (knowledge, skilled, education and health status)

b) Social capital (cooperatives, information sharing /communication, networks, social relations each other's and mobility)

c) Natural resources(land ,water, forest and mining)

d) Physical resource (infrastructures shelters energy, and communications and production equipment are means which pursue their livelihoods household)

f) Financial capital (credit and saving)

3. What are the polices and institutions which allow or dinette livelihood asset based in the area? (Institutions both formal and informal, polices, private and public sector and culture pursuit in the area)

4. What is the main reason in involving in different livelihood activities?

IV.Check list for key informant interview

1. In the different livelihood diversification, in which activities, since when and for how long?

2. How to evaluate the livelihood outcome of the community?

3. How do sustainable livelihood of the community?

4. What are the indicators of sustainability on household out of poverty in the area?

5.what is the food item more consumed in the this area ? From where you get?

6 .what is the major constraint exposed the community in this area ? How to manage?

V. Check list for Personal observation

1.what is the major vulnerability context you exposed to poverty ?

2 .Which kind of assetsaremoreimportant in your area ?

3.Which kinds of policies and institutional support changes in your area ?

4. What is the existing and dominant livelihood strategies in this area? You are profitble : how much?